

502-569-2301 tel 502-569-2304 fax



October 17, 2018

Big Rivers Electric Corporation Sebree Generating Station 9000 Highway 2096 Robards, Kentucky 42452

Engineer's Certification of Placement Above the Uppermost Aquifer Existing Green CCR Surface Impoundment EPA Final CCR Rule Sebree Station Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Placement above Sebree "Green" Existing CCR Surface Impoundment is in compliance with the Placement above the Uppermost Aquifer requirement of the Final CCR Rule at 40 CFR §257.60. Presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

In accordance with 40 CFR §257.60, the owner/operator of an existing CCR Surface Impoundment must demonstrate that the base of the unit is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). In accordance with 40 CFR §257.60(c)(1), the demonstration must be made by October 17, 2018. If such demonstration cannot be made, the unit is subject to the closure or retrofit requirements of 40 CFR §257.101

3.0 SUMMARY OF FINDINGS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Green Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).



4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, available data do not support a demonstration of Placement above the Uppermost Aquifer that meets the requirements of 40 CFR § 257.60(a).

M. Brian Cole Printed Name

October 17, 2018 Date



ADDRESS: AECOM

500 W Jefferson St Suite 1600

Louisville, KY 40202

TELEPHONE: (502)-569-2301

ATTACHMENTS: Placement above the Uppermost Aquifer Demonstration for Coal Combustion

Residuals



Your Touchstone Energy® Cooperative

Existing Green CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals (CCR)

October 17, 2018

Prepared by



Project Number: 60570534



TABLE OF CONTENTS

| 1.0 | INTR | RODUCTION | 1 |
|-----|---------------------------------|---|-------------|
| | 1.1 1.2 1.3 1.4 1.5 | ObjectiveRule RequirementsMethodology/BackgroundSite BackgroundSite History | 1 1 1 |
| 2.0 | GEO | DLOGY | 3 |
| 3.0 | HYD | ROGEOLOGY | 4 |
| | 3.1 3.2 | Groundwater Monitoring SystemGroundwater Flow | 5 |
| 4.0 | Upp | ERMOST AQUIFER | 7 |
| | 4.1 4.2 | Aquifer CharacteristicsPlacement Above the Uppermost Aquifer | 7 |
| 5.0 | Con | ICLUSIONS | 8 |
| 6.0 | Ref | ERENCES | 8 |



FIGURES

Figure 1. Site Location

Figure 2. Surface Impoundment Site Location

Figure 3. Surface Impoundment – Groundwater Contour Map – October 2017

ATTACHMENTS

Attachment A. Tables 1 and 2

Attachment B. Groundwater Elevation Summary

Attachment C. Boring Logs and Well Construction Diagrams



1.0 Introduction

1.1 Objective

The purpose of this demonstration is to document compliance with 40 Code of Federal Regulations (CFR) §257.60 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule) regarding the Placement above the Uppermost Aquifer Demonstration requirement for the existing "Green" Surface Impoundment at the Big Rivers Electric Corporation (BREC) Sebree Station in Sebree, Kentucky.

1.2 Rule Requirements

As required by 40 CFR §257.60(a) of the EPA Final CCR Rule, any existing CCR Surface Impoundments must be constructed with a base that is located no less than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevation. The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

The demonstration is due by October 17, 2018 in accordance with 40 CFR §257.60(c)(1). Those Surface Impoundments that cannot demonstrate compliance with the requirement of 40 CFR §257.60(a) are required by 40 CFR §257.60(c)(4) to cease placement of CCR in the unit within 6 months (April 2019).

1.3 Methodology/Background

The demonstration method involves the use of existing documentation of pertinent geologic and hydrogeologic information to develop a conceptual site model (CSM) for the uppermost aquifer inclusive of the definition of its uppermost limit, normal fluctuations in groundwater elevation, and the potential for the aquifer's hydraulic interconnection with overlying strata and the planned landfill limits. Existing documentation includes state and/or federal geologic maps and water resources publications, the logs of borings drilled on site for geotechnical purposes, the logs of monitoring wells installed on site and in surrounding areas, and design drawings for the unit.

1.4 Site Background

Big Rivers Electric Corporation (BREC) owns and operates the "Sebree" Station in Sebree, Kentucky. The Sebree Station is located in Webster County, approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see Figure 1). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and 2 HMP&L generating units. The Green Surface Impoundment is located directly south of the Sebree Station, situated north of the Green CCR Landfill. The current Green Surface Impoundment footprint is approximately 16 acres (Figure 2).





Figure 1: BREC Sebree Site Location



Figure 2: BREC Green Surface Impoundment Site Location



1.5 Site History

The Green Surface Impoundment is a combined incised/dike earthen embankment structure. It is diked on the west, south and east sides, while the north side is incised. The south dike has the greatest height reaching approximately 20 feet. The original ground surface within the Surface Impoundment footprint was irregular and the predominant features were small stream valleys draining eastward to Green River. Most of the central portion of the south dike was constructed on a subdued ridge. The toe of the outboard slope intersected a lower drainage area. Underlying preconstruction soils consisted of Loring-Grenada, Loring-Zanesville-Wellston (Henderson County) and Loring-Wellston-Zanesville (Webster County) soil associations that are generally characterized as well drained to moderately well-drained soils on nearly level to sloping uplands.

The CCR unit has been in place for 40 plus years and is used for the placement of CCR material; currently slurried bottom ash. The immediate watershed that drains to the CCR unit, and in which the CCR unit is considered to be located, is unnamed and 54.13 acres in size. The unnamed watershed discharges from the CCR impoundment outflow structure and is routed to the Green River.

The west dike is generally less than 5-feet in height and the south dike reaches a maximum height of 19.5 feet. The east dike reaches a maximum height of approximately 8 feet and is buttressed with a secondary parallel embankment that serves as a 40-foot wide roadway. The Burns and Roe, Inc., Engineering and Consultants June 30, 1978, site grading plans show the original construction layout and ground contours for the impoundment site. Bottom ash has been placed above the normal pool along the inboard side, essentially creating reclaimed land.

The impoundment discharge consists of two corrugated steel pipes, each 30 inches in diameter. The pipe intakes are through a common concrete headwall collection structure with a variable height steel debris deflector on each pipe intake.

2.0 GEOLOGY

The site lies in the Western Kentucky Coalfields, a gently rolling upland. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. Surface drainage is to the south to Groves Creek, a primary tributary to the Green River, and to the east to the Green River.

Published geologic mapping (Murphy, 2007) shows the site to be immediately underlain by unconsolidated loess representing the Pleistocene and Holocone geologic epoch and unconsolidated alluvium representing the Pleistocene and Holocene epochs. The loess reportedly consists of sandy and clayey silt. The alluvium reportedly consists of silt and clay with lesser amounts of sand and gravel.



The unconsolidated materials are shown to be underlain by the base of the Shelburn Formation (formerly identified as the Lisman Formation (Fairer, 1973)) and the Carbondale Formation, both of which represent the Pennsylvanian Geologic Period. The West Franklin Member consists of one to three layers of limestone interbedded by calcareous clay shale, and comprises the top of the Shelburn Formation. The Providence Limestone Member, consisting of limestone and interbedded shale, comprises the base of the Shelburn Formation. The Providence Limestone Member is reportedly absent in much of the area due to erosional channeling. Due to its discontinuous character and the presence of interbedded shale, hydrologically significant karst features are not present in the Providence Limestone Member. The underlying Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, the lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

The structure contours illustrated on the geologic map (Murphy, 2007) are based on the altitude of the No. 9 coal seam, and show the site to lie on the flank of a gentle anticline. Stratigraphic dip is shown to be on the order of 35 feet per mile to the southeast. No faults or other significant structural features are depicted on the geologic map.

3.0 HYDROGEOLOGY

The stratigraphic interval considered as the most prominent water transmitting zone within and adjacent to the Sebree Generating Station is material identified as the Upper Sandstone Member (Sebree sandstone) of the Carbondale Formation. The United States Geologic Survey (USGS) Geologic Map of the Robards Quadrangle describes the Sebree sandstone sequence as "Siltstone, sandstone, shale and coal: Siltstone, light- to medium-gray, micaceous, thin-bedded, and locally calcareous. Sandstone, light- to medium-gray, grayish- and yellowish-brown, fine- to medium-grained slightly micaceous, thin-bedded to massive; locally fills channels."

For purposes of compliance with the CCR Rule groundwater monitoring requirements; this sequence, and in particular the member sandstone intervals, is considered to be the uppermost aquifer underlying the Green CCR Surface Impoundment.

The sandstone units in the upper Carbondale Formation reportedly can provide well yields of 500 gallons per day (gpd) or greater with some reported yields on the order of 30 gallons per minute [gpm] (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.



3.1 Groundwater Monitoring System

Three temporary piezometers (P-10, P-11 and P-12) were installed adjacent to, and respectively; northwest, southwest and northeast of the Green CCR impoundment to determine the general direction of groundwater movement. Measured static water levels, from the highest to lowest elevation were observed in P-10 (highest), P-11 and P-12 (lowest) resulting in a calculated hydraulic gradient or apparent direction of groundwater movement is generally from northwest to southeast. This groundwater gradient characterization and the ability to locate monitoring wells specific to the CCR unit justify the placement of the minimum of one upgradient and three downgradient monitoring wells. The upgradient monitoring well (M-11) was installed adjacent to, and northwest of the impoundment. The downgradient monitoring wells (M-12, M-13 and M-14) were installed adjacent to, and respectively; south-southeast, southeast and east-northeast of the impoundment. All monitoring wells are completed in the stratigraphic interval described above. Approximate locations of the groundwater monitoring wells are shown on the Groundwater Monitoring Well Location Aerial Photo (Attachment B). Boring logs and well construction diagrams are presented as Attachment C.

3.2 Groundwater Flow

Water level data were collected from the unit during the nine baseline CCR monitoring events from March 2016 through October 2017as summarized on **Table 1** of **Attachment A**.

These data and the piezometric surface map presented below (**Figure 3**) represent general conditions at the Surface Impoundment and support the following analysis.

Overall groundwater flow beneath the footprint of the Green Surface Impoundment is to the east/southeast towards the Green River located east of the impoundment. The hydraulic gradients calculated from seasonal high, mid-point, and low events during the baseline period ranged from 0.0159 to 0.0283 towards the east/southeast as presented in **Table 2** of **Attachment A**.





Figure 3: Green Surface Impoundment - Piezometric Surface Map



4.0 UPPERMOST AQUIFER

The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

4.1 Aquifer Characteristics

Site-specific data pertaining to the aquifer characteristics beneath the Green Surface Impoundment were obtained prior to initiation of this CCR Program.

Available information pertaining to the sandstone units in the upper Carbondale Formation, identified as the uppermost aquifer beneath the Surface Impoundment, generally provide well yields of 500 gpd or greater with some reported yields on the order of 30 gpm (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

4.2 Placement Above the Uppermost Aquifer

Based on the available boring logs from the monitoring well system, the top of the upper Carbondale Formation (uppermost aquifer) is at an approximately elevation of 363 feet to the northwest (at MW-11), at 348 feet to the northeast (at MW-14), at 351 feet to the east (at MW-13), and not encountered to the southwest (at MW-12) of the Surface Impoundment. Illustrated well boring cross-sections are presented as **Attachment B**. Based on the interpreted top of the upper Carbondale Formation (uppermost aquifer), the base of the Surface Impoundment (360 feet) rests on or intercepts the uppermost aquifer within the northern most reaches of the Surface Impoundment and does not meet the 5-foot separation of the uppermost aquifer.

Groundwater data provided by BREC via baseline data collection from monitoring wells between March 2016 and October 2017 were used to interpret the elevations of the uppermost aquifer within the area of the Surface Impoundment. Seasonal measurements (April, June, August, October 2016, and January 2017) are presented within the Groundwater Elevation Summary located as **Attachment B**. Based on the cross sections presented in **Attachment B**, the potentiometric surface is approximately 5 feet (at MW-12) and 32 feet (at MW-11) above the lowest base of the Surface Impoundment (360 feet) and hydraulic connectivity cannot be disproven.



5.0 CONCLUSIONS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Green Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

6.0 REFERENCES

Burns and Roe, Inc., Engineering and Consultants, June 30, 1978, Site Grading Plans.

Fairer, G.M., Geologic Map of the Robards Quadrangle, Henderson and Webster Counties, Kentucky, U.S. Geological Survey, 1973.

Geotechnical and other information provided by Associated Engineers, Inc.

Engineering design drawings and other information provided by Big Rivers Electric Corporation.

Maxwell, B.W. and Devaul, R.W., Availability of Ground Water in Hopkins and Webster Counties, Kentucky, U.S. Geological Survey, 1962.

Murphy, 2007. Geological mapping.

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps



Attachment A

Tables 1 and 2

TABLE 1 MONITORING WELL NETWORK GROUNDWATER ELEVATIONS - APRIL 2016 - OCTOBER 2017

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION GREEN STATION SURFACE IMPOUNDMENT WEBSTER COUNTY, KENTUCKY

| | MW | <i>I</i> -11 | MV | <i>I</i> -12 | MW | <i>I</i> -13 | MW-14 | | |
|--------------------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|--|
| Reference Elevation TOIC*(ft, NAD27) | Upgradient/Background 401.32 | | Downgradient 395.54 | | Downgradient 394.60 | | Downgradient 390.71 | | |
| Date Measured | Depth to Water (ft) (feet) | GW Elevation (feet) | |
| 4/1/2016 | 8.20 | 393.12 | 32.51 | 363.03 | 18.86 | 375.74 | 22.13 | 368.58 | |
| 6/2/2016 | 8.32 | 393.00 | 29.62 | 365.92 | 18.83 | 375.77 | 23.01 | 367.7 | |
| 8/16/2016 | 8.45 | 392.87 | 27.79 | 367.75 | 20.60 | 374 | 25.55 | 365.16 | |
| 10/25/2016 | 9.06 | 392.26 | 29.57 | 365.97 | 20.30 | 374.3 | 26.52 | 364.19 | |
| 1/26/2017 1/27/2017 | 9.65 | 391.67 | 27.96 | 367.58 | 18.54 | 376.06 | 19.35 | 371.36 | |
| 5/1/2017 | 10.12 | 391.20 | 26.93 | 368.61 | 19.23 | 375.37 | 24.01 | 366.7 | |
| 8/11/2017 | 9.95 | 391.37 | 27.51 | 368.03 | 20.73 | 373.87 | 26.53 | 364.18 | |
| 9/20/2017 | 9.97 | 391.35 | 32.20 | 363.34 | 20.68 | 373.92 | 26.03 | 364.68 | |
| 10/9/2017 | 9.33 | 391.99 | 39.04 | 356.50 | 20.66 | 373.94 | 26.26 | 364.45 | |

^{*}Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015 Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum TOIC = Top of internal casing

GW = Groundwater; GS = Ground Surface; NM = Not measured

60560583.04 10/5/2018

TABLE 2

HYDRAULIC GRADIENT GROUNDWATER MONITORING SYSTEM

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION GREEN STATION SURFACE IMPOUNDMENT WEBSTER COUNTY, KENTUCKY

| | Well ID / GW Elev | ation (ft, NAD27) | Change in | Horizontal | Hydraulic |
|----------|-------------------|--------------------|----------------|---------------------|-----------|
| | MW-11 | MW-12 | Head (feet) | Distance* (feet) | Gradient |
| Apr 2016 | 393.12 | 363.03 | 30.09 | 1358 | 0.0222 |
| Oct 2016 | 392.26 | 365.97 | 26.29 | 1358 | 0.0194 |
| May 2017 | 391.20 | 368.61 | 22.59 | 1358 | 0.0166 |
| | | | | | |
| | Well ID / GW Elev | ration (ft, NAD27) | Change in | Horizontal | Hydraulic |
| | | | Head | Distance* | Gradient |
| | MW-11 | MW-13 | (feet) | (feet) | |
| Apr 2016 | 393.12 | 375.74 | 17.38 | 996 | 0.0174 |
| Oct 2016 | 392.26 | 374.30 | 17.96 | 996 | 0.0180 |
| May 2017 | 391.20 | 375.37 | 15.83 | 996 | 0.0159 |
| | | | | | |
| | Well ID / GW Elev | ation (ft, NAD27) | Change in | Horizontal | Hydraulic |
| | | | Head | Distance* | Gradient |
| | MW-11 | MW-14 | (feet) | (feet) | |
| Apr 2016 | 393.12 | 368.58 | 24.54 | 956 | 0.0257 |
| Oct 2016 | 392.26 | 365.16 | 27.10 | 956 | 0.0283 |
| May 2017 | 391.20 | 366.7 | 24.50 | 956 | 0.0256 |
| | | | | | |

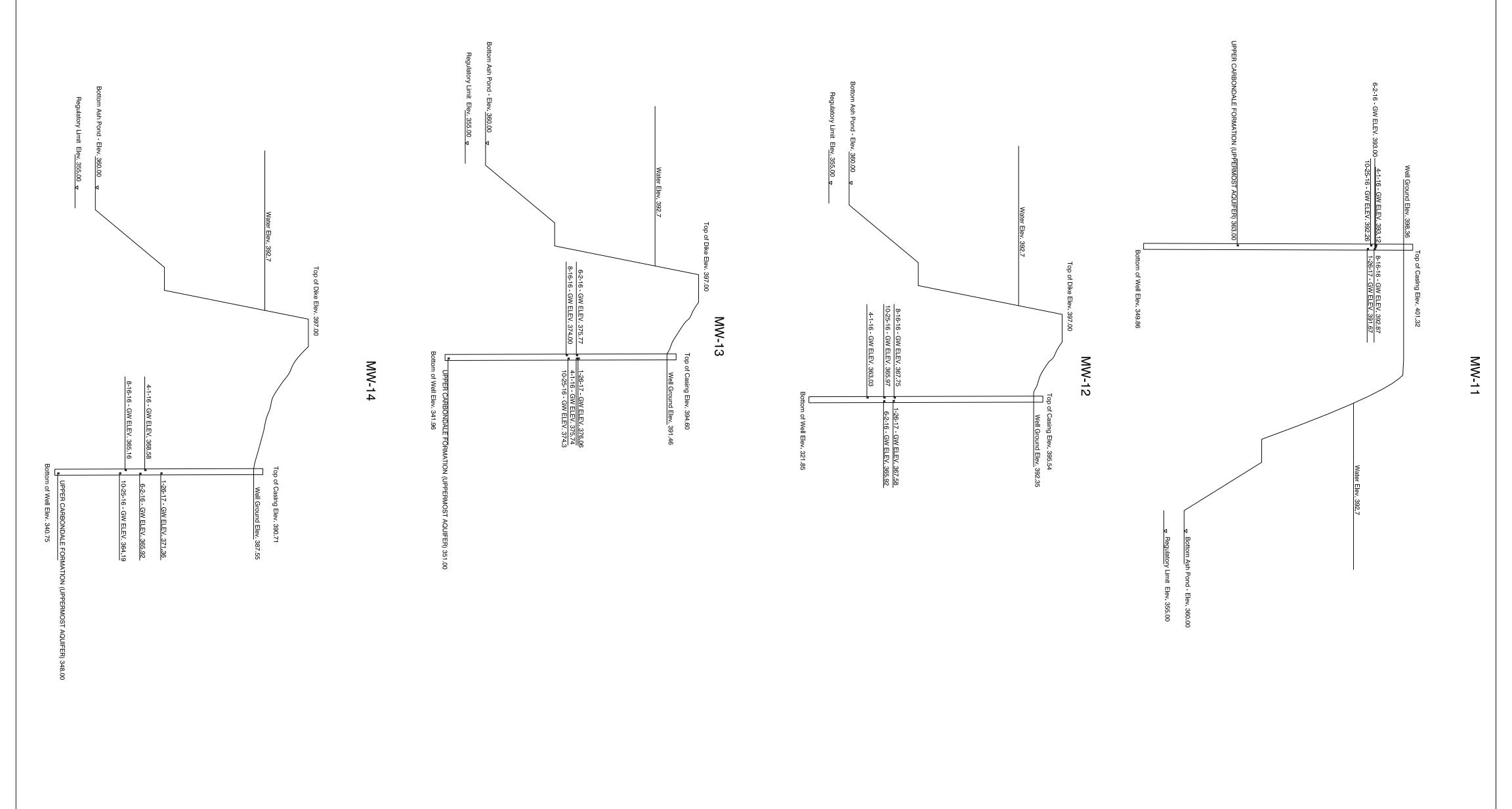
^{*}Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015

Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

60560583.04 10/5/2018

^{*}Horizontal distance between monitoring wells, parallel to the direction of groundwater flow (as determined by measurements utilizing Kentucky GIS)

Attachment B Groundwater Elevation Summary



MW-14

387.55

390.71

50.0

340.75

41.8

345.75

46.8

340.75

22.13

368.58

23.01

367.7

25.55

365.16

26.52

364.19

19.35

MW-13

391.46

394.60

52.6

341.96

44.5

346.96

49.5

341.96

18.86

375.74

18.83

375.77

20.60

374.00

20.30

374.3

18.54

376.06

MW-12

392.35

395.54

73.7

321.85

60.5

331.85

70.5

321.85

32.51

363.03

29.62

365.92

27.79

367.75

29.57

365.97

27.96

367.58

360.0

MW-11

398.36

401.32

51.5

349.86

43.5

354.86

48.5

349.86

8.20

393.12

8.32

393.00

8.45

392.87

9.06

392.26

9.65

391.67

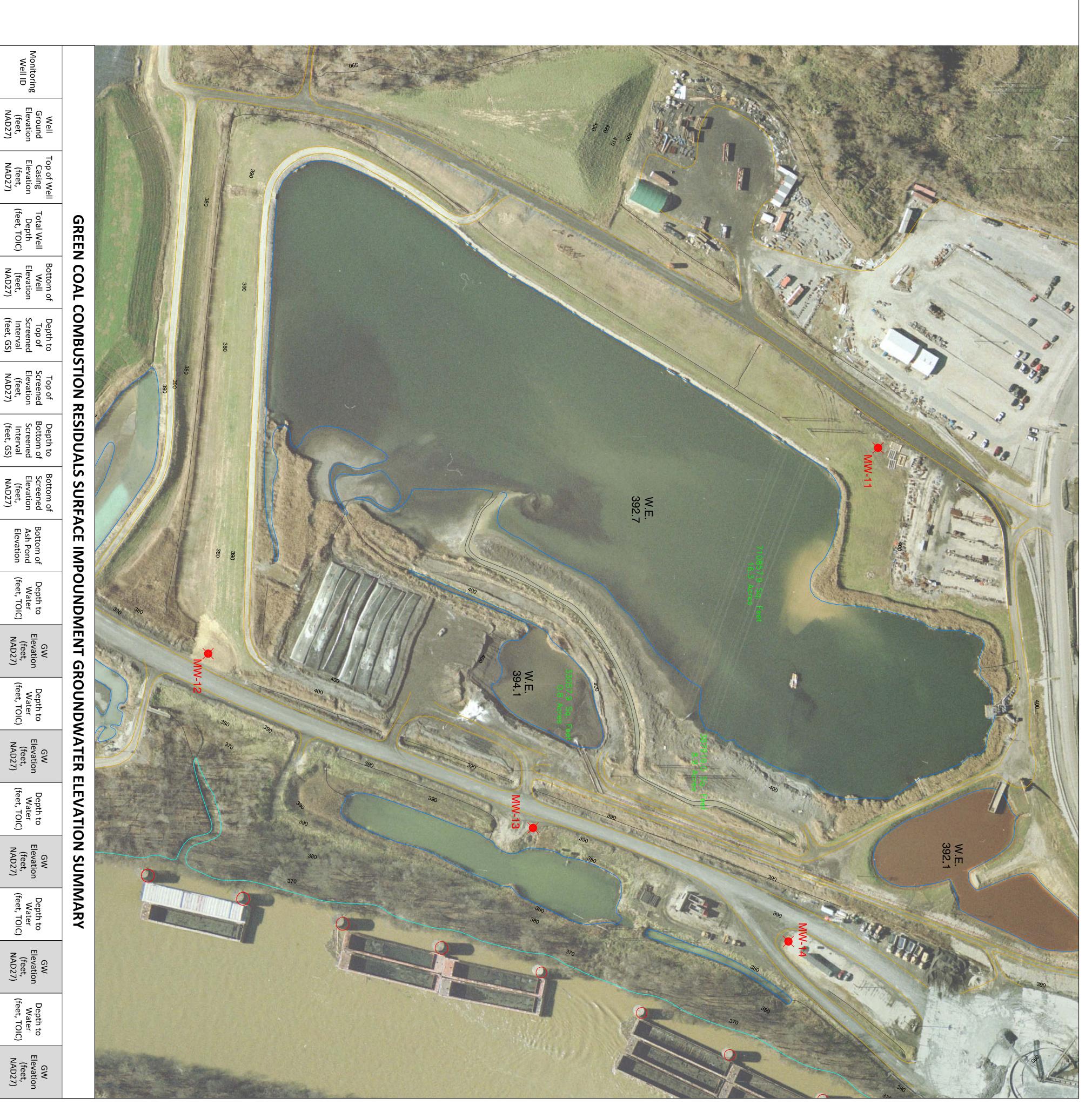
4/1/2016

6/2/2016

8/16/2016

10/25/2016

1/26/2017



Attachment C Boring Logs and Well Construction Diagrams

| TOED MEET COMPLICATION AND THE MACHINE TO THE MET TO THE PROPERTY OF THE PROPE | Use this form only to report installation of monitoring or water wells. |
|--|---|
| | |

A)

| Record must be typed or neatly printed or it will be returned to the driller as unacceptable. One copy to Division of Water, one copy to owner, one copy to driller's filles. | |
|---|---|
| Big Rivers Electric Corporation | Well ID (AK |
| | 8008 9038 |
| 6. City Menderson Henderson | |
| 4 Site name and address: 9. Site Sebree Station 1. Site 1. Sebree Station | Required Sketch map |
| e Site address 9000 Highway 2096 | |
| 11. City Robards State KY Zip 42.452 | |
| 14. Agency Interest 4196 Number CCR Rule 15. Facility type CERCLA Solid Waste Drinking Water (A) Number CCR Rule | 4. Coliform amalysis (if applicable) 5. Signed Variance (if applicable) 6. Other laboratory analysis report |
| 16.0vner 270 - 844 - 6031 Phone 270 - 521 - 7927 | 15 2 |
| Se USGS The Man Robards | Month Day Year 24. Install 1 1 7 15 |
| | ort depths in feet below gro |
| W. Physingraphic Delue Grass Tohio River Alluvium 22. Elevation determined by Region Delue Grass Tield WW. Coal Field MW. Coal Field MW. Coal Field MS. Plateau Dackson Purchase MSurvey Drior well for | |
| 31. Well status A Active | |
| | 27. Static Water level 5, 24 |
| | g height face (in) |
| Toring/ 0.1 Mining Driven Casing Donie Confidence Driven Casing Donie Driven Casing Donie | MATER WELLS ON Stimmted well yield |
| ng Compre | ¥ |
| | |
| | |
| | S |
| 22.3 10.5 2.0 2.38 Sch 40 DVC | |
| 5 48.5 6.5 2.0 2.88 Sch 40 Screen 0.010 39.5 41.5 Bei | 2 |
| | Carbmersible Dat Dacket |
| 48. Lithologic log (if more space is needed, continue on separate page) 49. Sketch map | |
| depth (the line) which and with the supermitting of a trachment. See attachment | Apparent quality and od |
| | 그 그 오 호 Janon Jalight |
| | |
| | |
| | Saland total |
| |] |
| | |
| | Sampled Month Day Year |
| | |
| t to 22.3%. 6 1/2% | Latitude 37.642616 |
| ellets set 39.5'-41.5'. After minimum 8 hour hydration time, cement grout set 22.3'-39.5' using t " casing pulled and grouting continued to 2'. Protective surface casing and pad installed after gr | |
| 51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge. Note: the driller is not responsible for partial groundwates, quality or quantity encountered while drilling or completing this well. | Latitud Method DINT DGPS WISUR DREP |
| | |
| number 0219-0364-00 company Associated Engineers, Inc. | |

727

91/5-1/2 70

48. Lithologic Log MW-11

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--|
| 0.0 | 0.3 | Ash |
| 0.3 | 2.0 | Silty clay light brown |
| 2.0 | 3.1 | Silty clay brown |
| 3.1 | 4.0 | Silty clay light gray |
| 4.0 | 6.7 | Silty clay gray moist |
| 6.7 | 15.0 | Silty clay yellowish brown moist |
| 15.0 | 21.3 | Silty clay w/weathered shale light gray |
| 21.3 | 22.3 | Sandy shale light gray soft |
| | 22.3 | Auger refusal |
| 22.3 | 33.0 | Sandy shale gray |
| 33.0 | 35.9 | Claystone |
| 35.9 | 40.4 | Sandstone gray |
| 40.4 | 41.5 | Claystone |
| 41.5 | 44.3 | Sandstone gray water |
| 44.3 | 45.1 | Shale gray |
| 45.1 | 49.9 | Sandstone with carbonaceous strks gray water |
| | 49.9 | TD |
| | | |

MONITORING WELL 8006-3938 (MW-11) CAP 8" ID STEEL PROTECTIVE CASING WITH CONSTRUCTION INCLUDES 4 BUMPER GUARDS INSTALLED LOCKING CAP AND WEEP HOLES IN ACCORDANCE WITH 401 KAR 6:350 SECTION 8 CONCRETE PAD MIN. 6" THICKNESS AND 3' DIAMETER 0.0 0.0' (ELEV. 398.5') ---CONCRETE 2.0 10 1/2" Hole Diam. 22.3 **NEAT CEMENT GROUT** 2"I.D. PVC RISER 39.5 **BENTONITE PELLETS** ____ 41.5° 43.5 0.010 SLOT SILICA SAND FILTER PACK PVC **SCREEN** 48.5 PLUG -6 1/2"

| | Well Construction Diagran |
|-----|---------------------------|
| | SOCIATED |
| TOE | NGINEERS, INC. |

BIG RIVERS ELECTRIC CORPORATION

Drawn By: D. Dunbar

2740 North Main St. · Madisonville, KY 42431
Phone: (270) 821-7732 · Fax: (270) 821-7789
www.associatedengineers.com

Job Number:

Date:

Scale:

15-0140G Revisions:

12/24/15

No Scale

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.

Original copy must be submitted to Division of Water within 60 days of completion.

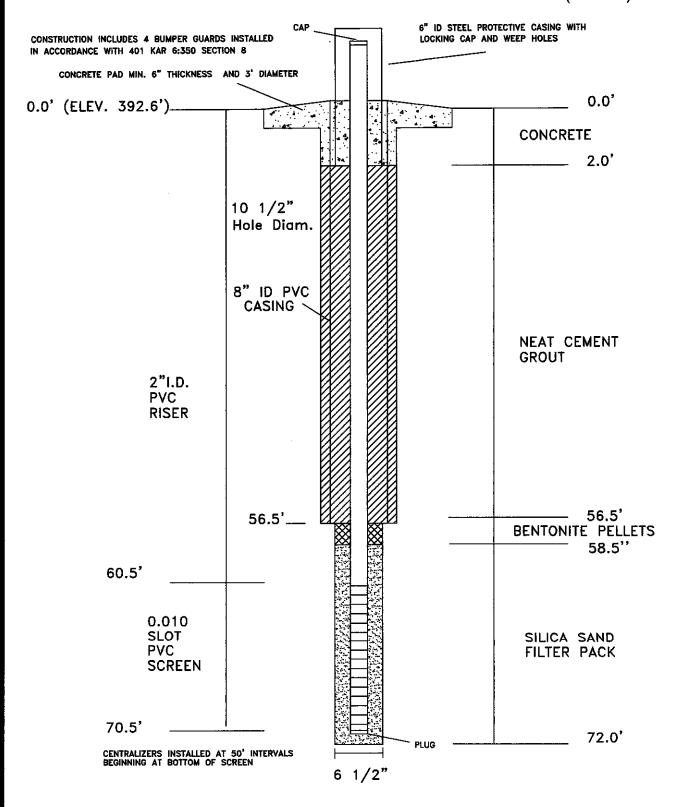
See instructions on reverse of form.

| Reco | | | | neat | ly printed | | urned t | to the driller as | unacceptable. 's files. | | | |
|--|---------------------------------------|--------------------------------|------------------|--|----------------|---|---|------------------------------|-----------------------------------|---|--|-------------|
| 4. Owne | (> 8 * | | | | Corporat | | | | | | 1. Kentucky Well ID (AKGWA) Numb | oer |
| 5. Owne | er• | | | | | | | | | | 8006 * 3939 | |
| address 201 Third Street 6. City 7. 8. | | | | | | | 2. Owner well ID# MW-12 | | | | | |
| | | idersor Iress diffe | | owne | er name and a | ıddress: | | State KY | Zip 4242 | 0 | 3. Attachments | |
| 9. Site name | Cah. | ree Sta | | | | | | | | | Required 1. Site plan or sketch map | X |
| 10. Site | ress 900(| \ IJinh | * |) 1006 | | | | | | | 2. Well location | |
| auu: | , | | way 2 | 20 7 0 |) | | | 12. | 13. | 74. | Obtained by GPS unit Conditionally Required | |
| * 4 . | Rob | aras | | ************* | | | yearaway. | State KY | Zip 42452 | | 3. Well diagram (monitoring well) | 図 |
| 14. Ager Inter | | L96 | | | | 15. Facility typ | 3444443445 | 40000000 | | Drinking Water Mining | Coliform analysis (if applicable) Signed Variance (if applicable) | |
| (AI) Num | ber | | | | | ID Number | r C(| CR Rule | | | Optional 6. Other laboratory analysis report | |
| 16. Own | | 270 | * § | 844 | | 5031 | 17. Site | <i>f 1</i> (1 | . 521 * | 7927 | 23. Install | |
| phoi 18. USG | | | | J-X-X | | | phone | | | | start date 01 05 16 Month Day Year | |
| | | obards | Ì | | | | | | | | 24. Install on date 01 14 16 | |
| 19. Cou | nty _W | /ebster | • | | | | | | irface tion (ft) | 392 "35 | Please report depths in feet below ground | |
| • | siographic | o∕ | Blue C | | ******* | hio River Alluvii | um | 2000000 | levation determi | ** | surface, not as relative elevations. 25. Total | |
| Regi | IVII | /man/man/m | E. Coa Miss. | | | /. Coal Field ackson Purchas | e . | ∐GF [汉]Su | * | Prior report Prior well log | depth 72.0 | |
| 29. Well | l use iculture | | Secument. | ШG | Seothermal | 30. Drilling mo ☐ Auger – H | ethod S | Jet wash | 31. Well stat 図 Active | tus Inactive | 26. Depth to bedrock 55.0 | |
| | nmercial | | | | | ☐ Auger – SS | s <u></u> | Push/probe | ☐ Unsuitabl | e for intended use | 27. Static water level 29, 32 | 2 |
| ☐ Dor | nestic | | | | IVAC | ☐ Auger – bu ☐ Auger – ha | | Rotary – air Rotary – mud | 32. Wellhead Flush | d ☐ Well cap | 28. Casing height above surface (in) 38.28 | |
| I Ind | | | *** | (mid-septemble | njection | ☐ Cable tool☐ Core | | Rotary – revers Sand point | | Sanitary seal relopment method | above surface (in) 38,28 WATER WELLS ONLY | |
| 区 Rer | nitoring / med | 01 | , ma | | Mining | ☐ Driven Cas ☐ Excavation | sing \square | * | ☐ Surging | ☐ Jetting | 34. Estimated well yield gpm | 1 |
| ☐ Put | olic | | L. | | Inused | 1 | | uger and air rot | | ☐ Backwashing ☐ Compressed air | gph • gpd | |
| NOTE: | : CODE RE | • | | | | ☐ Combined | - othe | r (specify): | | on of methods (specify): | 35. Well service #of peop | |
| 46. Well | completio | | | | | | | 47. Annulus fil | | p and water flush | served | |
| From | To | Borehole | Casir | ng T | r< | ······································ | | From | | Materia | 36. Disinfectant amount 37. Type □ Bleach | |
| depth (feet) | depth (feet) | diameter (inches) | ID (| | | ing type | Screen slot size | (feet) (feet) | If cuttings (co) | MATER WELLS only (shale or limestone only) must specify composition. | □ oz □ qt □ cups □ Hypo- chlorite | * |
| 0.0 56.5 | 56.5 60.5 | 10.5 | | 2.3 2.3 | | 0 PVC | di Parl Par s e reconnedigibilitano como e se | 0.0 2.0 | Concrete | | ☐ lb ☐ gal 38. Pitless adapter installed | |
| 60.5 | 70.5 | | 2.0 | | | 0 Screen | 0.010 | 2.0 56.5 56.5 58.5 | Cement gr Bentonite | • | ☐ Yes ☐ No | |
| | | | * | | | | | 58.5 72.0 | Silica sa | | 39. Pump installed: □ Submersible □ Jet □ bucket | r |
| 2475 W 2.0 | | / t / t | | | * * | ÷ | | | | | ☐ Turbine ☐ Hand ☐ No pum | ip qr |
| From | To | | | مممسخسسم | | inue on separate pon on ndicate apparent quality) | * ** | 49. Sketch map | | | 40. Depth to intake (ft) | |
| depih (ft) | depth (ft) | See a | **************** | A/400-0000000000000000000000000000000000 | | inikais appaisin quality) | | See attac | nment | | 41. Apparent quality and odor □ □ Clear ♀ ☱ ゼ ェ | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | IS MARK SUUUU |)n ulfur |
| | | | | | | | | | | | ₹ □ Turbid □ □ □ □ Sa | |
| | | | | | | | | | | | COLIFORM TEST 42. Coliform test type | |
| | | | | | | | | | | | ☐ fecal ☐ fecal and total | |
| | | | | | | | | | | | 43. Coliform test results □ 0 or <1.0 □ TNTC □ Confluer | nt |
| and and and | · · · · · · · · · · · · · · · · · · · | | | | | | | | | | or # colonies | *** |
| \$1 | | | | | | | | | | | per 100 m | |
| | | · | | | | | | | | | 44. Date sampled | |
| work is seen the in the seen that is seen th | | | | | | | | | | | Month Day Year 45. Date | |
| An An Anna Anna An An | | | | | | | | | | | analyzed | |
| 50. Comi | nenfe | ****************************** | | tan (1888) di minimina | | | | | | | Latitude | |
| 4 1/4" | ID HSA fo | | ** | | ~ | | | | et to 56.5'. 6 set 58.5'-70.5' | 1/2" tricone bit . Bentonite | 37.639148 | |
| pellets Remaini | set 58.5 | '-60.5' | . Aft | er m | inimum 8 ho | our hydration ti | ime unab | ole to pull 8" c | asing due to soi | | Longitude -87.501824 | |
| | | | | | | - | | • | nd correct to the bes | | Lat/Long Method | |
| Note: t Signatu | | s not res | ponsib | ne for | r patural grou | undwater quality of | or quantil | ty encountered wh | ile drilling or comp | eting this well. | ☐ INT ☐ GPS ☐ SUR ☐ REF | 3 |
| certified Certific | driller | | | | | | | signed | 4 /2 4 / | | | |
| | ation | | | | | Drilling | | | , | | | |
| number | 00 | 19-036 | 4-00 | | | 1 ./ | ciated l | Engineers, Inc. | | | Fev 02/29/20 | 40 |

48. Lithologic Log MW-12

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|---|
| 0.0 4.0 | 4.0 12.6 | Silty clay brown fill Ash gray wet fill |
| 12.6 | 13.6 | Clay gray wet |
| 13.6 21.2 | 21.2 23.0 | Silty clay yellowish brown very moist Silty clay yellowish brown very moist |
| 23.0 | 31.5 | Silty clay yellowish brown very moist |
| 31.5 | 37.0 | Silty clay brown, moist |
| 37.0 | 40.5 | Silty clay yellowish brown moist |
| 40.5 | 52.0 | Silty clay brown moist |
| 52.0 | 55.0 | Silty clay brown very moist |
| 55.0 | 56.5 | Shale gray soft |
| 56.5 | 63.0 | Shale gray |
| 63.0 | 63.6 | Shale and interbedded sandstone gray |
| 63.6 | 72.0 | Shale gray |
| | 72.0 | TD |

MONITORING WELL 8006-3939 (MW-12)



| | BIG RIVERS ELECTRIC CORPORATION | Job Number: | 150140G | Revisions: |
|----|---------------------------------|--|----------------|------------|
| | BIOTATE CELECTION CONTROL | Date: | 1/13/16 | |
| | Well Construction Diagram | Scale: | No Scale | |
| | | Drawn By: | D. Dunbar | |
| FE | Phone: | th Main St. · M (270) 821-7732 ww.associated | 2 · Fax: (270) | 821-7789 |

| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | // |
|--|--|
| entrance to be produced by the common control of the control of th | |
| | |
| | |
| TO THE CONTRACT OF THE PROPERTY OF THE PROPERT | NBSVACCURUSNN $NACCURUS SANDO MARKAN SAND$ |
| | |
| | |
| 900 - 1900 - 200 - 1 - 2 - 200 - 1900 - 1900 - 2000 - 200 - | |
| | |
| | |
| | |
| | CKY WELL CONSTRUCTION RECORD |
| | |
| 10^{-1} Constitution of the constitution of | |
| | |
| | |
| and the control of t | |
| the state of the s | |
| | |
| | |
| | , and the state of |

Use this form only to report installation of monitoring or water wells.

Original copy must be submitted to Division of Water within 60 days of completion.

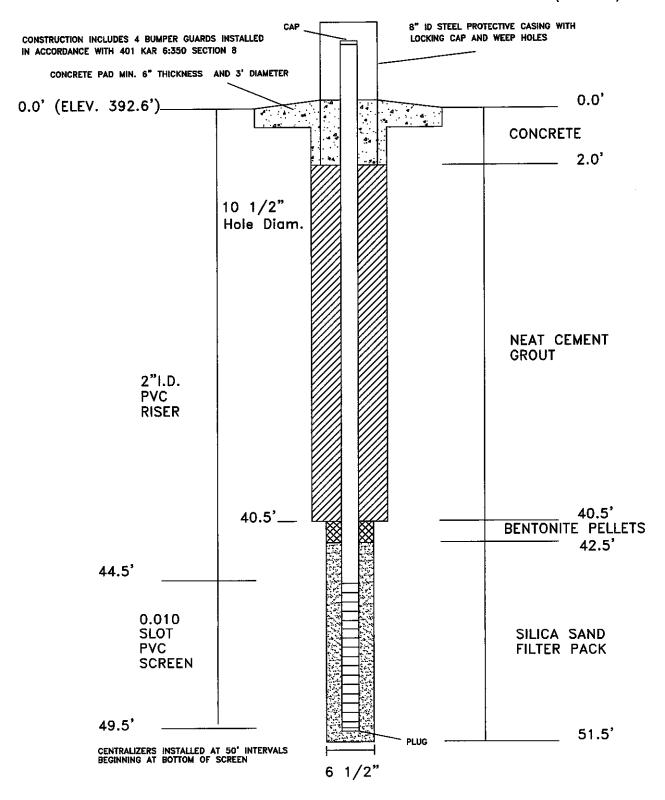
See instructions on reverse of form.

| Record must be typed or neatly printed One copy to Division of Water, | | to the driller as unacceptable | e. | |
|---|--|--|---|--|
| 4. Owner name Big Rivers Electric Corpora 5. Owner address 201 Third Street | | | | 1. Kentucky Well ID (AKGWA) Number 8006 * 3940 2. Owner |
| 6. City Henderson If site name and address differ from owner name and 9. Site Name Sebree Station 10. Site | l address: | 7. State KY Zip 424 | 120 | 2. Owner Well ID# MW-13 3. Attachments Required 1. Site plan or sketch map 2. Well location |
| 10. Site address 9000 Highway 2096 11. City Robards 14. Agency | 15. Facility type | 12. 13. State KY Zip 424. CERCLA □ Solid Waste | ł52 П Drinking Water | 2. Well location On topographic map, OR Obtained by GPS unit Conditionally Required 3. Well diagram (monitoring well) 4. Coliform analysis (if applicable) |
| Interest 4196 (AI) Number | & DF ID Number CC | RCRA UST [CR Rule | ☐ Mining Water | 5. Signed Variance (if applicable) 囚 Optional 6. Other laboratory analysis report □ |
| 16. Owner phone 270 = 844 = | 6031 17. Site phone | //// box / 2 | - 7927 | 23. Install 12 28 15 start date Month Day Voc |
| 18. USGS topo map Robards 19. County Webster | | 21. Surface elevation (ft) | 391 46 | Month Day Year 24. Install end date 1 11 15 Please report depths in feet below ground |
| Region □ E. Coal Field 図\ □ Miss. Plateau □. 29. Well use | Ohio River Alluvium W. Coal Field Jackson Purchase 30. Drilling method | [X]Survey [| mined by I Prior report Prior well log | surface, not as relative elevations. 25. Total depth 51.5 26. Depth to |
| | Auger – HS | arusii/hione F | Inactive able for intended use | bedrock 39,5 27. Static water level 15,52 28. Casing height |
| ☐ Industrial ☐ Injection ☐ Mining ☐ Remed ☐ Unused | ☐ Cable tool ☐☐ Core ☐☐ Driven Casing ☐☐ Excavation ☐☐ | Rotary – reverse X Locking Sand point 33. Well de Sonic Surging Dumping | Sanitary seal evelopment method Jetting Backwashing | above surface (in) 37.68 WATER WELLS ONLY 34. Estimated well yield gpm |
| NOTE: CODE REQUIRED for most well uses. See back of form for codes. | | auger and air rotary | Backwashing Compressed air ation of methods (specify): mp and water flush | ● □ gph □ gpd □ service #of people served |
| 46. Well completion: Casing and screens From To Borehole Casing Cache Casing | | 47. Annulus fill and seal | Material | 36. Disinfectant amount 37. Type |
| depth (feet) depth (inches) diameter diam (in) Came (in | Screen Screen 40 PVC 40 PVC 0.010 | depth depth (feet) (fee | Jrout ce pellets | oz |
| 48. Lithologic log (if more space is needed, con | *************************************** | 49. Sketch map | | ☐ Supmersible ☐ Jet ☐ bucket ☐ Turbine ☐ Hand ☐ No pump 40. Depth to |
| From depth (fit) depth (fit) (include any show of water and See attachment | indicate apparent quality) | See attachment | | intake (ft) 41. Apparent quality and odor Clear Cloudy Cloudy Muddy Muddy Coliform test type fecal fecal and total 43. Coliform test results O or <1.0 TNTC Confluent # colonies per 100 mL 44. Date sampled |
| | | | | Month Day Year 45. Date analyzed |
| O. Comments 4 1/4" ID HSA followed by 10 1/2" drag bit a advanced to 51.5'. Silica sand set 49.5-51 pellets set 40.5'-42.5'. 8" casing pulled a surface casing and pad installed after grounds. | .5'. 2" casing and scre after minimum 8 hour hyd t cured. | een set. Sand placed 42.5'-49. dration time. Hole grouted 2'- | 7.5'. Bentonite -40.5'. Protective I | Latitude 37.640856 Longitude -87.500722 |
| I. Affirmation: The work described above was done Note: the driller is not responsible for natural grown Signature of Certified driller | undwater quality for quantity | this report is true and correct to the best yencountered while drilling or company Date signed | pleting this well. | Lat/Long Method INT GPS SUR GREP Date Received |
| 0210.0364.00 | Drilling company Associated Er | Engineers, Inc. | | 分27 // rev 02/29/2012 |

48. Lithologic Log MW-13

| To depth (ft) | Description |
|------------------|---|
| 1.0 2.7 | Ash black Silty clay gray |
| 10.6 | Silty clay yellowish brown |
| 12.8 | Silty clay light gray |
| 23.5 | Silty clay yellowish brown wet |
| 34.2 | Silty clay brown very moist |
| 39.5 | Silty clay yellowish brown very moist |
| 40.5 | Sandstone yellowish brown soft weathered |
| 40.5 | Auger refusal |
| 50.4 | Sandstone yellowish brown soft weathered |
| 51.1 | Shale gray |
| 51.5 | Sandy shale gray |
| 51.5 | TD |
| | depth (ft) 1.0 2.7 10.6 12.8 23.5 34.2 39.5 40.5 40.5 50.4 51.1 51.5 |

MONITORING WELL 8006-3940 (MW-13)



| | BIG RIVERS ELECTRIC CORPORATION | Job Number: | 150140G | Revisions: | |
|----|-----------------------------------|--|----------|------------|--|
| | BIG TAVETO ELLOTTAG GOTA GIVATION | Date: | 1/13/16 | | |
| | Well Construction Diagram | Scale: | No Scale | | |
| | | Drawn By: D. Dunbar | | | |
| FE | Phone: (| 2740 North Main St. · Madisonville, KY 42431 Phone: (270) 821-7732 · Fax: (270) 821-7789 www.associatedengineers.com | | | |

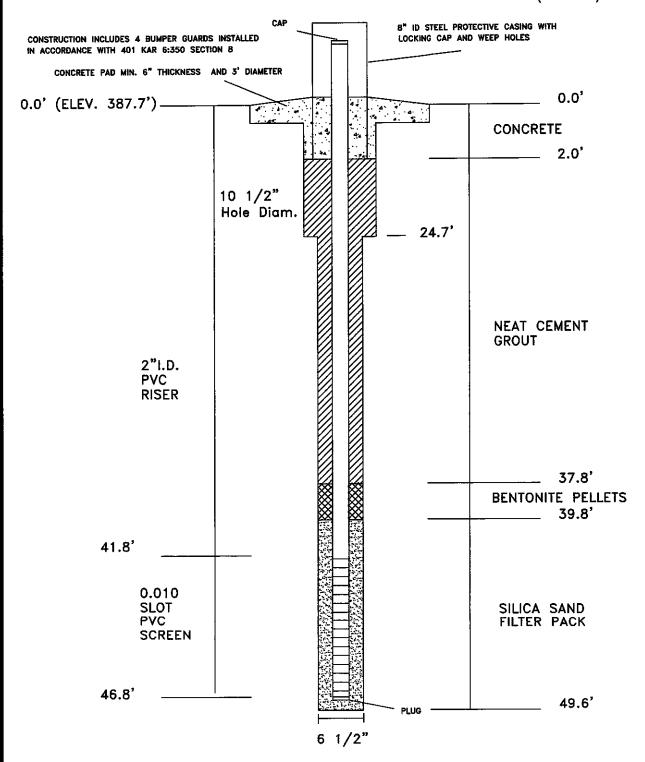
rev 02/29/2012

| Oı | L | | form o | nly to repo submitted | ort ir to E | nstall Divisio | lation of on of Wa | monitor ater with | ing or wa iin 60 day | ter wells. | CORD letion. | | 8006-3941 |
|--|--|---|--|--|---|--|---|---|--|--|--|---|--|
| | | w 4 | or nea | * - | ed o | or it v | will be re | eturned | to the d | | nacceptable. | | |
| 4. Owner | | | | of Water, | | | py to ov | vner, or | ne copy t | o driller's | files. | | 1. Kentucky Well ID (AKGWA) Number |
| name 5. Owner | ne Big Rivers Electric Corporation | | | | | | | | | | | | 8006 * 3941 |
| address | | | | | | | | | 7. | | 8. | | 2. Owner well ID# MW-14 |
| 6. City If site name a | ity $Henderson$ State K e name and address: | | | | | | | | State | KY | Zip 42420 | O | 3. Attachments |
| 9. Site name | Sebr | ee Stat | ion | | | | | | | | | | Required 1. Site plan or sketch map ☑ |
| 10. Site address | 9000 | Highv | vay 20 | 96 | | | | | | | | | 2. Well location On topographic map, <u>OR</u> |
| 11. City | Roba | | * | | | | | | 12. State | KY | 13. Zip 42452 | 2 | Obtained by GPS unit <u>Conditionally Required</u> |
| 14. Agency | ************************************** | *************************************** | | *************************************** | | 15. | Facility (| type [| CERCL | | | Drinking Water | 3. Well diagram (monitoring well) 区 4. Coliform analysis (if applicable) □ |
| Interest (AI) Number | | 96 | | | | | & ID Numl | | RCRA CCR Ru | le []U | ST <u> </u> | Mining | 5. Signed Variance (if applicable) 図 Optional 6. Other laboratory analysis report □ |
| 16.Owner phone | | 270 | * 84 | 4 * | 6 | 5031 | | 17. S pho | | 270 • | 521 • | 7927 | 23. Install 12 21 15 start date |
| 18. USGS | *** | i. 1 | | | *************************************** | | | | | | | | Month Day Year 24. Install |
| topo ma | | obards | | | | | | | | 21. Sur | | | end date 1 7 15 |
| ¥ | W | ebster M | 3lue Gr | ass [| Tol | hio R | ≀iver Allu | ıvium | | elevatio 22. Ele | n (ft) vation determi | 387 , 55 | Please report depths in feet below ground surface, not as relative elevations. |
| 20. Physiog Region | ~· ~ | | E. Coal | Field 5 | $\overline{\mathbb{Q}}$ W | I. Coa | al Field on Purch | | | ☐GPS | ПМар П | Prior report Prior well log | 25. Total depth 49,6 |
| 29. Well us | | | /liss. Pl | | | 30. | Drilling | method | 3 | 1100000000 | 31. Well stat 図 Active | | T 26. Depth to 21.9 |
| ☐ Agricul | | | | Geotherr | | 3 | Auger – Auger – | 45 | ∐ Jet wa I Push/p | | <u> </u> | le for intended use | 27. Static water level 18,97 |
| ☐ Comm | | | ********** | HVAC | *** | | Auger – Auger – | | □ Rotary □ Rotary | | 32. Wellhea ☐ Flush | d □ Well cap | 28. Casing height |
| 一 | rial | | | Injection | | | Cable to Core | | | - reverse | 3 | Sanitary seal velopment method | above surface (in) 37, 92 WATER WELLS ONLY |
| Monito | oring / d | 01 | | Mining | | | | | Sonic Unkno | | Surging | ☐ Jetting | 34. Estimated well yield gpm |
| ☐ Public | \$ > | | | Unused | | 図(| Combine | ed - HS | auger ai | nd air rotai | ☐ Pumping ☐ Bailing | Compressed air | |
| | | QUIREI | | ist well uses les. | S. | | Combine | ed – oth | ıer (speci | fy): | Todayalli (| on of methods (specify): up and water flush | 35. Well service #of people |
| | | | | | | ** | | | | | * | - ₩- | المريسين بسيميس الله المريسين بسيميس |
| 46. Well con | mpletio | n: Casii | ng and s | screens | | | | | 47. Aı | inulus fill : | ınd seal | | served 36. Disinfectant amount 37. Type |
| From | To | Borehole diameter | Casing diam (in | | Cas | sing typ | Çe | Scre | | depin | | Maleriai WATER WELLS only | 36. Disinfectant amount 37. Type |
| From depth (feet) | | Borehole diameter (inches) | Casing diam (in ID OE |) | iemienia | ing typ | \$\$\$\$\$\\\\$\$\$\\\\\\\\\\\\\\\\\\\\\\\\\\\ | Scre | | To | HOTE for | | 36. Disinfectant amount 37. Type ☐ Bleach ☐ Hypo- ☐ oz ☐ qt ☐ cups chlorite |
| From depth (feet) | To depth (feet) | Borehole diameter (inches) | Casing diam (in ID OE |) .38 Sc) | h 4 | | vc | 3 | ficin decin | decin (feet) | | WATER WELLS only If shale or innectors only) Trust operaty composition | 36. Disinfectant amount 37. Type Bleach Hypo- oz qt cups chlorite b gal 38. Pitless adapter installed |
| depth (feet) 24.7 4 | To depth (feet) 24.7 | Borehole diameter (inches) 10.5 | Casing diam (in ID OE 2 . 0 2 |) .38 Sc) | h 4 h 4 | 10 PV | vc | sict s | From decin (feet) 0.0 2.0 37.8 | 37.8 39.8 | Concrete Bentonite | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach |
| From depth (feet) 24.7 4 | To depth (feet) 24.7 | Borehole diameter (inches) 10.5 | Casing diam (in 2 . 0 2 . 2 . 2 |) .38 Sc) | h 4 h 4 | 10 PV | VC VC | sict s | 7 (set) 2 (set) 0 . 0 | 2.0 37.8 39.8 | Concrete Cement gr | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite b gal 38. Pitless adapter installed Yes No |
| From depth (feet) 0.0 2 24.7 4 41.8 4 48. Litholog | To depth (feet) 24.7 41.8 46.8 | Borehole diameter (inches) 10.5 6.5 | Casing diam (in 2 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | 0.0 | 7 (ee) 2 (ee) 2 . 0 2 . 0 37 . 8 39 . 8 | 37.8 39.8 | Concrete Bentonite | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite Ib gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or Bubmersible Jet bucket Turbine Hand No pump 40. Depth to |
| From depth (feet) 24.7 41.8 48. Litholog From | To depth (feet) 24.7 41.8 | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite blo gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 2 . 0 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite blogal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Clear Comparison of the property of the propert |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite blo gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- chlorite bl gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Clear Cloudy Muddy |
| From depth (feet) 24.7 41.8 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo- cups chlorite lb |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite blo gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or Bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Clear Cloudy Clo |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite lb |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite blogal 38. Pitless adapter installed Yes No 39. Pump installed: Submersible Jet bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Clear Muddy O |
| From depth (reet) 24.7 4 41.8 4 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Bailer or chlorite Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) Hand No pump 41. Apparent quality and odor Clear Discount Discou |
| From depth (reet) 24.7 41.8 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Ib |
| From depth (feet) 24.7 41.8 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Ib |
| From depth (reet) 24.7 41.8 48. Litholog From | To depth (feet) 24.7 41.8 egic log | Borehole diameter (inches) 10.5 6.5 (if more | Casing diam (in 1D OI 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci | h 4 h 4 cont | tinue (| VC VC creen | o.o | 2.0 2.0 37.8 39.8 49.5k | 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | waterwells only must specify composition out pellets | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Bailer or bucket Turbine Hand No pump |
| 424.77 4 41.8 4 48. Litholog From death (6) | | forehole diameter (inches) 10.5 6.5 See a | Cesing diam (in 10 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | is needed, the show of which is ment. | h 4 h 4 cont | inue (| vc creen on separa | ate page) | 49. See | 2.0 37.8 39.8 49.6 etch map | Concrete Cement gr Bentonite Silica sa | water wells only: by, shale or investors only) must specify composition. Cout pellets and | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Jet Ducket Ducket Turbine Hand No pump |
| From depth (feet) 24.77 4 41.8 4 48. Litholog From depth (ft) d | ic los ic los its its its its its its its i | Llowed Sil | Casing dier (not 2) 2 . 0 2 2 2 . 0 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Sci 38 Sci 38 Sci 38 Sci 38 Sci is needed, | h 4 h 4 cont | advan | on Separa oned to 2 | ate page) | Figure (Get) O.O 2.0 37.8 39.8 See Figure (Get) O.O 2.0 Ay. Sk Figure (Get) O.O Ay. | 2.0 37.8 39.8 49.6 etch map attach | Concrete Cement gr Bentonite Silica sa ment | water wells only: by, shells or investors only) must specify composition. cout pellets and | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Ib |
| So. Comme 41.8 48. Litholog From depth (ft) depth (ft) advanced to pellets so 8" casing | ic is second and a second a second and a second a second and a second and a second and a second and a second | Josephole diameter (inches) 10.5 6.5 See a 39.8 and gr | Casing diam (in OI | is needed. is needed. is needed. iment id set 46.6 minimum 6 continued | h 4 h 4 cont | advan | on separa apparent que ced to 2 apparent que protective | ate page) sity) ing and time, c ve surfa | Fig. (Get) O.O 2.O 37.8 39.8 49.Sk See Fig. (Get) O.O 2.O 2.O 37.8 49.Sk See Get casing | casing set. Sand satt set 24. and pad i | Concrete Cement gr Bentonite Silica sa ment | water Wells only: by she or investors only) must specify composition. Tout pellets and grout cured. | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Bailer or Jet Bailer or Submersible Jet Bailer or Submersible Jet Bailer or Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Clear Jet Jet Cloudy Cloudy Cloudy Cloudy Jet Jet Turbid Jet Jet Jet Jet Turbine Hand No pump 40. Depth to Intake (ft) Jet Jet Jet Cloudy Cloudy Jet Jet Jet Cloudy Jet Jet Jet Jet Jet Jet Coliform test type Jet Jet Jet Jet Jet Jet Grand Jet |
| 50. Comme 41.8 4 48. Litholog From depth (ft) de pellets se 8" casing | ciclog Ciclog | liowed (inches) 10.5 6.5 See a a a a a a a a a a a a a a a a a a | Casing diam (in 10 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Scl. 38 Scl. 38 Scl. 38 Scl. is needed. is needed. with a set 46.8 in ment continued is above was | h 4 h 4 cont | advan O Sc inue inue inue contaite e unde | on separa on separa oned to 2 ordention Protective | ate page) any ing and time, c ve surfa | Fig. (Section (Section) 2.0 2.0 37.8 39.8 49.Signature Section S | casing set. Sand sat set 24. and pad into the analysis analysis and pad into the analysis and the analysis analysis and the analysis and the analysis and the analysis and th | Concrete Cement gr Bentonite Silica sa ment correct to the be | water Wells only: by she of imestors only) must specify composition. Tout pellets and | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite b gal 38. Pitless adapter installed Yes No 39. Pump installed: Bailer or bucket Turbine Hand No pump 40. Depth to intake (ft) 41. Apparent quality and odor Unit Unit |
| 50. Comme 41.8 4 48. Litholog From depth (ft) de pellets se 8" casing | depth (feet) 24.7 41.8 Figure 1 Figure 2 Figure 2 Figure 37.8 Figure 2 Figure 2 Figure 37.8 Figure 37.8 Figure 37.8 Figure 37.8 Figure 37.8 | liowed (inches) 10.5 6.5 See a a a a a a a a a a a a a a a a a a | Casing diam (in 10 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 38 Scl. 38 Scl. 38 Scl. 38 Scl. is needed. is needed. with a set 46.8 in ment continued is above was | h 4 h 4 cont | advan O Sc inue inue inue contaite e unde | on separa on separa oned to 2 ordention Protective | ate page) any ing and time, c ve surfa | Fig. (Section (Section) 2.0 2.0 37.8 39.8 49.Signature Section S | casing set. Sand sat set 24. and pad into the analysis analysis and pad into the analysis and the analysis analysis and the analysis and the analysis and the analysis and th | Concrete Cement gr Bentonite Silica sa ment correct to the be | water Wells only: y, shell or investors only) must specify composition. cout pellets and grout cured. | 36. Disinfectant amount 37. Type Bleach Hypo-chlorite Bailer or Boucket Turbine Hand No pump Cloudy Sailer Cloudy Sailer Cloudy Sailer Colliform test type Fecal Fecal and total As Coliform test results O or <1.0 TNTC Confluent Confluent Colonies Per 100 mL Confluent Colonies Col |

48. Lithologic Log MW-14

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--|
| 0.0 | 2.4 | Ash black |
| 2.4 | 3.8 | Silty clay yellowish brown |
| 3.8 | 11.2 | Silty clay brown |
| 11.2 | 16.9 | Silty clay yellowish brown w/sandstone fragments |
| 16.9 | 21.9 | Sandstone yellowish brown soft weathered |
| 21.9 | 24.7 | Shale gray soft |
| | 24.7 | Auger refusal |
| 24.7 | 26.5 | Shale gray soft |
| 26.5 | 39.8 | Sandy shale gray |
| 39.8 | 48.3 | Sandstone gray, water |
| 48.3 | 49.1 | Shale and interbedded sandstone gray |
| 49.1 | 49.3 | Sandstone gray |
| 49.3 | 49.6 | Shale gray |
| | 49.6 | TD |

MONITORING WELL 8006-3941 (MW-14)



| Well Construction Diagram |
|---------------------------|
| SOCIATED NIC |
| AUHACERO, HAU. |

BIG RIVERS ELECTRIC CORPORATION

15-0140G Revisions: Date: 1/13/16 Scale: No Scale Drawn By: D. Dunbar

2740 North Main St. · Madisonville, KY 42431 Phone: (270) 821-7732 · Fax: (270) 821-7789 www.associatedengineers.com

Job Number:



502-569-2301 tel 502-569-2304 fax



October 17, 2018

Big Rivers Electric Corporation Sebree Generating Station 9000 Highway 2096 Robards, Kentucky 42452

Engineer's Certification of Placement Above the Uppermost Aquifer Demonstration Existing Reid/HMPL CCR Surface Impoundment EPA Final CCR Rule Sebree Station Robards, Kentucky

1.0 PURPOSE

The purpose of this document is to certify that the Placement above Sebree "Reid/HMPL" Existing CCR Surface Impoundment is in compliance with the Placement above the Uppermost Aquifer requirement of the Final CCR Rule at 40 CFR §257.60. Presented below is the project background, summary of findings, limitations and certification.

2.0 BACKGROUND

In accordance with 40 CFR §257.60, the owner/operator of an existing CCR Surface Impoundment must demonstrate that the base of the unit is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). In accordance with 40 CFR §257.60(c)(1), the demonstration must be made by October 17, 2018. If such demonstration cannot be made, the unit is subject to the closure or retrofit requirements of 40 CFR §257.101

3.0 SUMMARY OF FINDINGS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Reid/HMPL Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the upper most limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).



4.0 CERTIFICATION

I, Michael Brian Cole, being a Registered Professional Engineer in good standing in the State of Kentucky, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the available data do not support a demonstration of Placement above the Uppermost Aquifer that meets the requirements of 40 CFR § 257.60(a).

M. Brian Cole Printed Name

October 17, 2018 Date



ADDRESS: AECOM

500 W Jefferson St Suite 1600

Louisville, KY 40202

TELEPHONE: (502)-569-2301

ATTACHMENTS: Placement above the Uppermost Aquifer Demonstration for Coal Combustion

Residuals



Your Touchstone Energy® Cooperative

Existing "Reid/HMPL" CCR Surface Impoundment

Disposal of Coal Combustion Residuals (CCR) from Electric Utilites Final Rule

Placement above the Uppermost Aquifer Demonstration for Coal Combustion Residuals (CCR)

October 17, 2018

Prepared by



Project Number: 60571713



TABLE OF CONTENTS

| 1.0 | INTR | Introduction | | | | | | |
|-----|---------------------------------|---|-------------|--|--|--|--|--|
| | 1.1 1.2 1.3 1.4 1.5 | ObjectiveRule RequirementsMethodology/BackgroundSite BackgroundSite History | 1 1 1 | | | | | |
| 2.0 | GEC | DLOGY | 3 | | | | | |
| 3.0 | HYDROGEOLOGY | | | | | | | |
| | 3.1 3.2 | Groundwater Monitoring SystemGroundwater Flow | 4 | | | | | |
| 4.0 | UPPERMOST AQUIFER | | | | | | | |
| | 4.1 4.2 | Aquifer CharacteristicsPlacement Above the Uppermost Aquifer | | | | | | |
| 5.0 | Con | ICLUSIONS | 8 | | | | | |
| 6.0 | References | | | | | | | |



FIGURES

Figure 1. Site Location

Figure 2. Surface Impoundment Site Location

Figure 3. Surface Impoundment – Groundwater Contour Map – September 2017

ATTACHMENTS

Attachment A. Tables 1 and 2

Attachment B. Groundwater Elevation Summary

Attachment C. Boring Logs and Well Construction Diagrams



1.0 Introduction

1.1 Objective

The purpose of this demonstration is to document compliance with 40 Code of Federal Regulations (CFR §257.60 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule)regarding the Placement above the Uppermost Aquifer Demonstration requirement for the existing "Reid/HMPL" Surface Impoundment at the Big Rivers Electric Corporation (BREC) Sebree Station in Sebree, Kentucky.

1.2 Rule Requirements

As required by 40 CFR §257.60(a) of the EPA Final CCR Rule, existing CCR Surface Impoundments must be constructed with a base that is located no less than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevation. The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

The demonstration is due by October 17, 2018 in accordance with 40 CFR §257.60(c)(1). Those Surface Impoundments that cannot demonstrate compliance with the requirement of 40 CFR §257.60(a) are required by 40 CFR §257.60(c)(4) to cease placement of CCR in the unit within 6 months (April 2019).

1.3 Methodology/Background

The demonstration method involves the use of existing documentation of pertinent geologic and hydrogeologic information to develop a conceptual site model (CSM) for the uppermost aquifer inclusive of the definition of its uppermost limit, normal fluctuations in groundwater elevation, and the potential for the aquifer's hydraulic interconnection with overlying strata and the planned landfill limits. Existing documentation includes state and/or federal geologic maps and water resources publications, the logs of borings drilled on site for geotechnical purposes, the logs of monitoring wells installed on site and in surrounding areas, and design drawings for the unit.

1.4 Site Background

Big Rivers Electric Corporation (BREC) owns and operates the "Sebree" Station in Sebree, Kentucky. The Sebree Station is located in Webster County, approximately 3.2 miles northeast of the town of Sebree, Kentucky situated immediately east of the Pennyrile Parkway approximately 1.5 miles north of the intersection of the Pennyrile Parkway and Kentucky Route 56 (see Figure 1). Sebree Station is composed of 2 Green generating units, one Reid generating unit, and 2 HMP&L generating units. The Green Surface Impoundment is located directly south of the Sebree Station, situated north of the Green CCR Landfill. The current Green Surface Impoundment footprint is approximately 16 acres (Figure 2).





Figure 1: BREC Sebree Site Location



Figure 2: BREC Reid/HMPL Surface Impoundment Site Location



1.5 Site History

The Reid/HMPL Surface Impoundment is a combined incised/dike earthen embankment structure. It is diked on the west, south and east sides, while the north side is incised. The west dike has the greatest height reaching approximately 42 feet. The original terrain on which the Surface Impoundment was constructed generally sloped toward the west. Although the Green River is located less than 0.5 miles from the site, the structure does not extend significantly into the floodplain. Underlying preconstruction soils consisted of Loring-Grenada, Loring-Zanesville-Wellston (Henderson County) and Loring-Wellston-Zanesville (Webster County) soil associations are generally characterized as well drained to moderately well drained soils on nearly level to sloping uplands.

The CCR unit has been in place for 40 plus years and is used for the placement of CCR material; currently slurried bottom ash. The immediate watershed that drains to the CCR unit, and in which the CCR unit is considered to be located, is unnamed and 25.45 acres in size. The unnamed watershed discharges from the CCR impoundment outflow structure and is routed to the Green River.

The embankment reaches its greatest relief of approximately 42 feet on the west side. The Burns & McDonnell Engineering Co., October 8, 1971 design drawings show the inboard slope and central core portion of the dike to be constructed of compacted soil fill and the outboard slope to be consisted of sand fill. A sand blanket drain was designed for the outboard third of the base of the dike for the majority of the length and the plans show a crushed limestone drainage layer with a minimum thickness of 18 inches topped with a minimum 6-inches thick sand layer that extends across the entire width of the dike cross section in the southwest corner. The plans also show a cut-off trench in the original ground below dike crest and extending for the entire length of the dike.

The impoundment discharge consists of a rectangular concrete drop structure with a variable height steel debris skimmer. The pool elevation can be controlled by adding or removing stop logs. The discharge structure connects to a 24-inch diameter smooth walled metal pipe underground conveyance.

2.0 GEOLOGY

The site lies in the Western Kentucky Coalfields, a gently rolling upland. In the vicinity of the site, maximum topographic relief is on the order of 80 feet. Surface drainage is to the south to Groves Creek, a primary tributary to the Green River, and to the east to the Green River.

Published geologic mapping (Murphy, 2007) shows the site to be immediately underlain by unconsolidated loess representing the Pleistocene and Holocone geologic epoch and unconsolidated alluvium representing the Pleistocene and Holocene epochs. The loess reportedly consists of sandy and clayey silt. The alluvium reportedly consists of silt and clay with lesser amounts of sand and gravel.

The unconsolidated materials are shown to be underlain by the base of the Shelburn Formation (formerly identified as the Lisman Formation (Fairer, 1973) and the Carbondale Formation, both of which represent the Pennsylvanian Geologic Period. The West Franklin Member consists of



one to three layers of limestone interbedded by calcareous clay shale, and comprises the top of the Shelburn Formation. The Providence Limestone Member, consisting of limestone and interbedded shale, comprises the base of the Shelburn Formation. The Providence Limestone Member is reportedly absent in much of the area due to erosional channeling. Due to its discontinuous character and the presence of interbedded shale, hydrologically significant karst features are not present in the Providence Limestone Member. The underlying Carbondale Formation consists of cyclic sequences of sandstones, shales, siltstones and coals. The Carbondale sediments were deposited in a fluvial-deltaic system. As a result of this depositional environment, the lithologic units of the Carbondale tend to be lenticular bodies rather than continuous sheet-like strata. Gradational and abrupt horizontal changes in lithology are often encountered.

The structure contours illustrated on the geologic map (Murphy, 2007) are based on the altitude of the No. 9 coal seam, and show the site to lie on the flank of a gentle anticline. Stratigraphic dip is shown to be on the order of 35 feet per mile to the southeast. No faults or other significant structural features are depicted on the geologic map.

3.0 HYDROGEOLOGY

The stratigraphic interval considered as the most prominent water transmitting zone within and adjacent to the Sebree Generating Station is material identified as the Upper Sandstone Member (Sebree sandstone) of the Carbondale Formation. The United States Geologic Survey (USGS) Geologic Map of the Robards Quadrangle describes the Sebree sandstone sequence as "Siltstone, sandstone, shale and coal: Siltstone, light- to medium-gray, micaceous, thin-bedded, and locally calcareous. Sandstone, light- to medium-gray, grayish- and yellowish-brown, fine- to medium-grained slightly micaceous, thin-bedded to massive; locally fills channels."

For purposes of compliance with the CCR Rule groundwater monitoring requirements; this sequence, and in particular the member sandstone intervals, is considered to be the uppermost aquifer underlying the Reid/HMPL CCR Surface Impoundment.

The sandstone units in the upper Carbondale Formation reportedly can provide well yields of 500 gallons per day (gpd) or greater with some reported yields on the order of 30 gallons per minute [gpm] (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

3.1 Groundwater Monitoring System

Five temporary piezometers (P-13/P-13A, P-14 and P-15/P-15A) were installed adjacent to and respectively; northwest, southeast and southwest of the Reid/IIMPL CCR impoundment to determine general direction of groundwater movement. Measured static water levels, from the highest to lowest elevation were observed in P-13/13A (highest), P¬14 and P-15/P-15A (lowest) resulting in a calculated hydraulic gradient or apparent direction of groundwater movement is generally from east-northeast to west-southwest. This groundwater gradient characterization



and the ability to locate monitoring wells specific to the CCR unit justify the placement of the minimum of one upgradient and three down-gradient monitoring wells. The upgradient monitoring well (MW-7) was installed adjacent to, and east-northeast of the impoundment. The downgradient monitoring wells (MW-8, MW-9 and MW-10) were installed adjacent to, and respectively; west, southwest and south-southwest of the impoundment. All monitoring wells are completed in the stratigraphic interval described above. Approximate locations of the groundwater monitoring wells are shown on the Groundwater Monitoring Well Location Aerial Photo (Attachment B). Boring logs and well construction diagrams are presented as Attachment C.

3.2 Groundwater Flow

Water level data were collected from the unit during the nine baseline CCR monitoring events from March 2016 through October 2017as summarized on **Table 1** of **Attachment A.**

These data and the piezometric surface map presented below (**Figure 3**) represent general conditions at the Surface Impoundment and support the following analysis.

Overall groundwater flow beneath the footprint of the Reid/HMPL Surface Impoundment is to the southwest towards an unnamed tributary to Groves Creek located west/southwest of the impoundment. The hydraulic gradients calculated during the baseline period ranged from 0.0251 to 0.0258 towards the southwest as presented in **Table 2** of **Attachment A**.



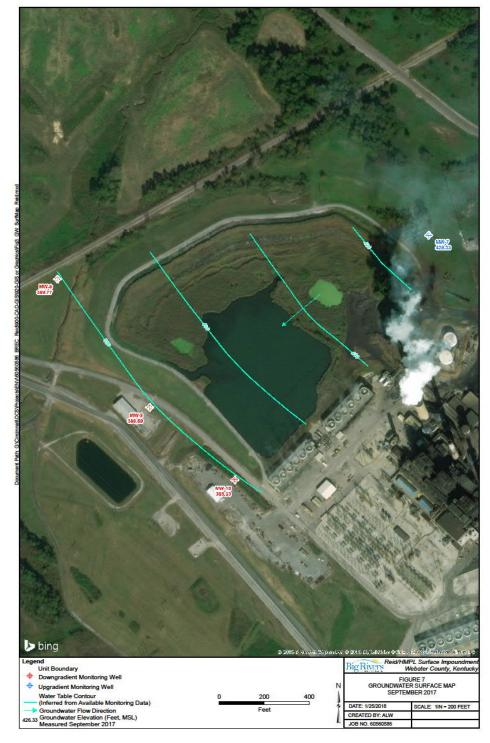


Figure 3: Reid/HMPL Surface Impoundment - Piezometric Surface Map



4.0 UPPERMOST AQUIFER

The "uppermost aquifer" is defined by 40 CFR §257.40 as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. This definition includes a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water.

4.1 Aquifer Characteristics

Site-specific data pertaining to the aquifer characteristics beneath the Reid/HMPL Surface Impoundment were obtained prior to initiation of this CCR Program.

Available information pertaining to the sandstone units in the upper Carbondale Formation, identified as the uppermost aquifer beneath the Surface Impoundment, generally provide well yields of 500 gpd or greater with some reported yields on the order of 30 gpm (Maxwell and Devaul, 1962). The Providence Limestone Member of the Shelburn Formation is reported to yield little to no water to wells. The lower Carbondale Formation, above and below the No. 9 coal seam, consists primarily of shales that reportedly yield little to no water to wells. Previous site-specific investigations, by others, have noted the presence of perched zones of saturation in the overlying unconsolidated materials.

4.2 Placement Above the Uppermost Aquifer

Based on the available boring logs from the CCR Rule monitoring well system, the top of the upper Carbondale Formation (uppermost aquifer) is at an approximately elevation of 413.4 feet to the northeast (at MW-7), 384.2 feet to the south (at MW-10), 364.4 feet to the southwest (at MW-9), and 341.6 feet to the west (at MW-8) of the Surface Impoundment. Illustrated well boring cross-sections located adjacent to the Surface Impoundment are presented as **Attachment B**. Although it is not directly evidenced whether the base of the Surface Impoundment (389.2 feet in the western corner and approximately 400 feet in the northeast corner) intercepts or encroaches on the 5 foot separation from the top of the upper Carbondale Formation (uppermost aquifer) in the vicinity of monitoring well MW-7, hydraulic connectivity cannot be disproven based on available groundwater surface data discussed below.

Groundwater data provided by BREC via baseline data collection from monitoring wells between March 2016 and October 2017 were used to interpret the elevations of the uppermost aquifer within the area of the Surface Impoundment. Seasonal measurements (March, May, August, October 2016, and January 2017) are presented within the Groundwater Elevation Summary located as **Attachment B**. Based on the cross sections presented in **Attachment B**, the potentiometric surface is approximately 0.5 and 2 feet above the lowest base of the Surface Impoundment (389.2 feet at the west corner) and averaging approximately 28 feet above the Surface Impoundment base of approximately 400 feet at the northeast corner.



5.0 CONCLUSIONS

Available data regarding site groundwater, site geology, and physical limits of the unit for the Reid/HMPL Surface Impoundment do not evidence a 5-foot separation between the base of the impoundment and the uppermost limit of the uppermost aquifer and they do not support a lack of hydraulic connectivity between the unit and the aquifer as specified in 40 CFR §257.60(a). Therefore the unit does not meet the Placement above the Uppermost Aquifer requirement of 40 CFR §257.60(a).

6.0 REFERENCES

Burns and Roe, Inc., Engineering and Consultants, June 30, 1978, Site Grading Plans.

Fairer, G.M., Geologic Map of the Robards Quadrangle, Henderson and Webster Counties, Kentucky, U.S. Geological Survey, 1973.

Geotechnical and other information provided by Associated Engineers, Inc.

Engineering design drawings and other information provided by Big Rivers Electric Corporation

Maxwell, B.W. and Devaul, R.W., Availability of Ground Water in Hopkins and Webster Counties, Kentucky, U.S. Geological Survey, 1962.

Murphy, 2007. Geological mapping.

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps



Attachment A

Tables 1 and 2

TABLE 1 MONITORING WELL NETWORK GROUNDWATER ELEVATIONS - MARCH 2016 - OCTOBER 2017 REID/HMPL STATION SURFACE IMPOUNDMENT

BIG RIVERS ELECTRIC CORPORATION SEBREE STATION WEBSTER COUNTY, KENTUCKY

| | MV | V-7 | M\ | N-8 | MV | V-9 | MW-10 | | |
|--------------------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|----------------------------------|---------------------------|--|
| Reference Elevation TOIC*(ft, NAD27) | | Background I.43 | _ | radient 4.29 | - | radient 5.40 | Downgradient 422.27 | | |
| Date Measured | Depth to Water (ft) (feet) | GW Elevation (feet) | |
| 3/30/2016 | 14.93 | 429.5 | 1.64 | 392.65 | 3.44 | 391.96 | 31.71 | 390.56 | |
| 5/31/2016 | 14.91 | 429.52 | 1.41 | 392.88 | 3.28 | 392.12 | 29.60 | 392.67 | |
| 8/23/2016 | 15.75 | 428.68 | 1.42 | 392.87 | 3.56 | 391.84 | 29.96 | 392.31 | |
| 10/18/2016 | 16.77 | 427.66 | 2.38 | 391.91 | 4.49 | 390.91 | 30.63 | 391.64 | |
| 1/31/2017 2/9/2017 | 15.59 15.81 | 428.84 428.62 | 1.94 2.12 | 392.35 392.17 | 4.16 4.52 | 391.24 390.88 | 30.63 30.63 | 391.64 391.64 | |
| 5/11/2017 | 15.73 | 428.70 | 1.74 | 392.55 | 4.05 | 391.35 | 30.20 | 392.07 | |
| 8/23/2017 | 17.72 | 426.71 | 4.16 | 390.13 | 6.46 | 388.94 | 32.46 | 389.81 | |
| 9/22/2017 | 18.10 | 426.33 | 4.52 | 389.77 | 6.71 | 388.69 | 32.74 | 389.53 | |
| 10/11/2017 | 18.16 | 426.27 | 4.67 | 389.62 | 6.9 | 388.50 | 32.90 | 389.37 | |

^{*}Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015 Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum TOIC = Top of internal casing

GW = Groundwater; GS = Ground Surface; NM = Not measured

60560583.04 10/5/2018

TABLE 2

HYDRAULIC GRADIENT GROUNDWATER MONITORING SYSTEM

BIG RIVERS ELECTRIC CORPORATION - SEBREE STATION REID/HMPL STATION SURFACE IMPOUNDMENT WEBSTER COUNTY, KENTUCKY

| | Well ID / GW Elev | vation (ft, NAD27) | Change in | Horizontal | Hydraulic Gradient | |
|-----------|-------------------|--------------------|----------------|---------------------|-----------------------|--|
| | MW-7 | MW-9 | Head (feet) | Distance* (feet) | | |
| Mar 2016 | 429.50 | 391.96 | 37.54 | 1466 | 0.0256 | |
| May 2016 | 429.52 | 392.12 | 37.40 | 1466 | 0.0255 | |
| Aug 2016 | 428.68 | 391.84 | 36.84 | 1466 | 0.0251 | |
| Oct 2016 | 427.66 | 390.91 | 36.75 | 1466 | 0.0251 | |
| Jan 2017 | 428.84 | 391.24 | 37.60 | 1466 | 0.0256 | |
| May 2017 | 428.70 | 391.35 | 37.35 | 1466 | 0.0255 | |
| Aug 2017 | 426.71 | 388.94 | 37.77 | 1466 | 0.0258 | |
| Sept 2017 | 426.33 | 388.69 | 37.64 | 1466 | 0.0257 | |
| Oct 2017 | 426.27 | 388.50 | 37.77 | 1466 | 0.0258 | |

Survey coordinates were based on the Kentucky State Plane, Kentucky Southern Zone, NAD27 datum

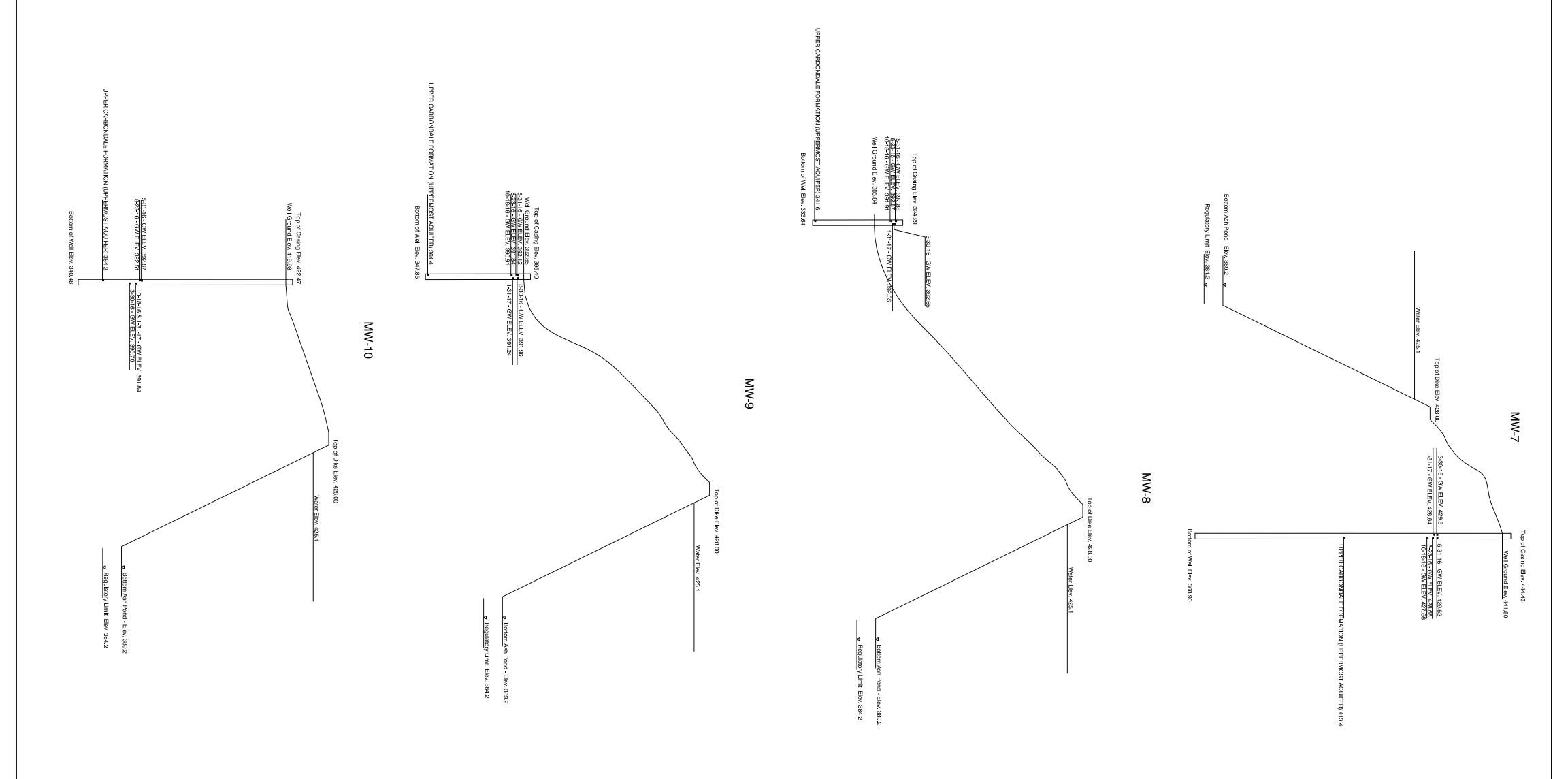
60560583.04 10/5/2018

^{*}Reference elevation of monitoring wells surveyed by Associated Engineers, Inc., Madisonville, Kentucky, January 2015

^{*}Horizontal distance between monitoring wells, parallel to the direction of groundwater flow (as determined by measurements utilizing Kentucky GIS)

Attachment B Groundwater Elevation Summary

| MW-10 | MW-9 | MW-8 | MW-7 | | Monitoring Well ID | | ADOO NO N |
|--------|--------|--------|--------|------------|---|--|---|
| 419.98 | 392.85 | 385.84 | 441.80 | | Well Ground Elevation (feet, NAD27) | | |
| 422.47 | 395.40 | 394.29 | 444.43 | | Top of Well Casing Elevation (feet, NAD27) | - | |
| 82.0 | 47.6 | 60.7 | 75.5 | | Total Well Depth (feet, TOIC) | REID/HMPL | |
| 340.48 | 347.85 | 333.64 | 368.90 | | Bottom of Well Elevation (feet, NAD27) | /IPL COA | |
| 69.5 | 35.0 | 47.2 | 67.9 | | Depth to Top of Screened Interval (feet, GS) | L COMB | |
| 350.48 | 357.85 | 338.64 | 373.90 | | Top of Screened Elevation (feet, NAD27) | L COMBUSTION RESIDUALS SURFACE IMPOUND | W.E. 425.1 |
| 79.5 | 45.0 | 52.2 | 72.9 | | Depth to Bottom of Screened Interval (feet, GS) | RESIDU | |
| 340.48 | 347.85 | 333.64 | 368.90 | | Bottom of Screened Elevation (feet, NAD27) | JALS SUI | B OIN OIN |
| | | 389.2 | | | Bottom of Ash Pond Elevation | RFACE IN | |
| | | 14.93 | | 3/30/ | Depth to Water (feet, TOIC) | MPOUNI | |
| 390.70 | 391.96 | 392.65 | 429.50 | 3/30/2016 | GW Elevation (feet, NAD27) | MENT | V.E. 425.1 |
| 29.6 | 3.28 | 1.41 | 14.91 | 5/31/2016 | Depth to Water (feet, TOIC) | GROUNDWATER | |
| 392.87 | 392.12 | 392.88 | 429.52 | | GW Elevation (feet, NAD27) | DWATER | 430 |
| 29.96 | 3.56 | 1.42 | 15.75 | | Depth to Water (feet, TOIC) | R ELEVA | 26.6 E |
| 392.51 | 391.84 | 392.87 | 428.68 | | GW Elevation (feet, NAD27) | TION SU | 430 |
| 30.63 | 4.49 | 2.38 | 16.77 | 10/18/2016 | Depth to Water (feet, TOIC) | ELEVATION SUMMARY | |
| 391.84 | 390.91 | 391.91 | 427.66 | | GW Elevation (feet, NAD27) | | 428 ₂ ≅ E |
| 30.63 | 4.16 | 1.94 | 15.59 | | Depth to Water (feet, TOIC) | | |
| 391.84 | 391.24 | 392.35 | 428.84 | | GW Elevation (feet, NAD27) | | ON NATURAL DESIGNATION OF THE PROPERTY OF THE |



Attachment C Boring Logs and Well Construction Diagrams

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.

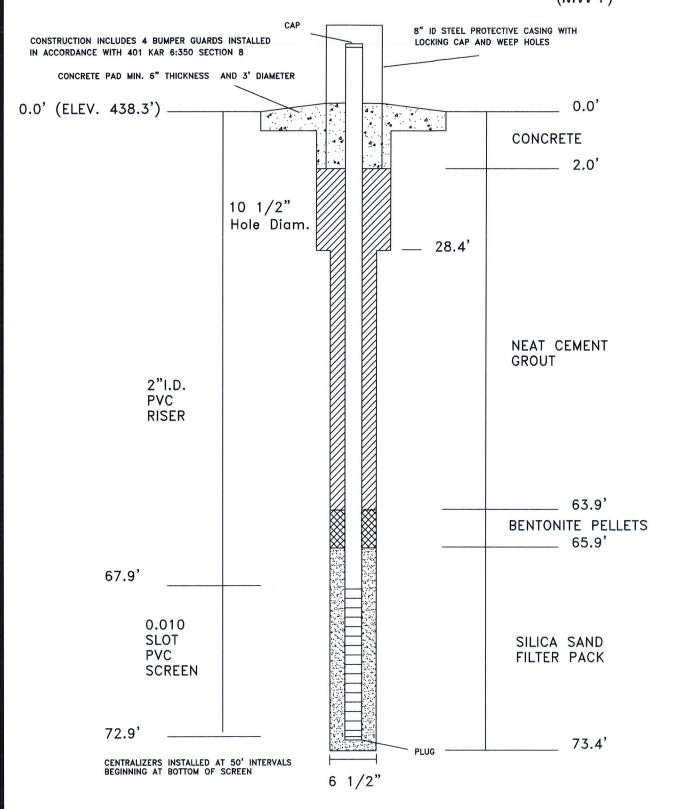


| One copy to Division of Water, | one copy to owner, on | e copy to driller's | s files. | |
|---|--|----------------------------|--|---|
| 4. Owner name Big Rivers Electric Corpora | ation | | - | 1. Kentucky Well ID (AKGWA) Number |
| 5. Owner address 201 Third Street | | | | 8006 • 3934 |
| 6. City Henderson | | 7. State KY | 8. Zip 42420 | well ID# MW - 7 |
| If site name and address differ from owner name and | i address: | K1 | 42420 | 3. Attachments Required |
| name Sebree Station | | | | 1. Site plan or sketch map |
| 10. Site address 9000 Highway 2096 | | | | 2. Well location On topographic map, <u>OR</u> |
| 11. City Robards | | 12. State KY | 13. Zip 42452 | Obtained by GPS unit Conditionally Required |
| | 15 E-204 A | | | 3. Well diagram (monitoring well) |
| 14. Agency Interest 4196 | 15. Facility type | CERCLA ∐ 8 | Solid Waste Drinking Water JST Mining | 4. Coliform analysis (if applicable) 5. Signed Variance (if applicable) |
| (AI) Number | 1 | CR Rule | | Optional 6 Other laboratory and their annual |
| 16.Owner 0.70 | 17. Sit | | | 23 Instali |
| phone 270 = 844 = | 6031 phon | | 521 • 7927 | start date 12 4 15 |
| 18. USGS topo map Robards | | | | 24. Install |
| 19. County Henderson | | 21. Sur elevatio | | end date O 15 Please report depths in feet below ground |
| <u> </u> | Ohio River Alluvium | | evation determined by | surface, not as relative elevations. |
| Region 🔲 E. Coal Field 🔯 | W. Coal Field Jackson Purchase | □GP5 ⊠Sun | S □Map □ Prior report | 25. Total 73 4 |
| 29. Well use | 30. Drilling method | Modif | 31. Well status | 26. Depth to |
| ☐ Agriculture ☐ Geotherm | | Jet wash | Active Inactive Unsuitable for intended use | bedrock 24 1 |
| Commercial Heat pum | D Auger – SS ☐ Auger – bucket☐ | Push/probe Rotary – air | | water level 12 . 30 |
| ☐ Domestic ☐ HVAC ☐ Injection | Auger hand | | 32. Wellhead Flush Well cap Locking Sanitary seal | 28. Casing height above surface (in) 31. 56 |
| Monitoring / □ Mining | Core |] Sand point | 33. Well development method | 310 30 |
| Remed 01 | ☐ Driven Casing ☐ Excavation ☐ |] Sonic] Unknown | Surging Jetting Pumping Backwashing | 34. Estimated well yield gpm |
| Public | ☑ Combined – HS a | auger and air rota | ry Bailing Compressed a | ir |
| NOTE: CODE REQUIRED for most well uses. See back of form for codes. | Combined – othe | r (specify): | Combination of methods (specify) | 35. Well service |
| 46. Well completion: Casing and screens | <u> </u> | 47. Annulus fill : | Air-lift pump and water flush | #of people served |
| From To Borehole Casing | | Fmm To | Meterial | 36. Disinfectant amount 37. Type |
| depth depth diameter diam (in) (feet) (feet) (feet) (inches) ID OD | Screen slot size | denth denth | NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition. | ☐ Bleach ☐ Hypo- |
| | 40 PVC | 0.0 2.0 | Concrete | — ∐oz □qt □cups chlorite □lb □gal |
| 28.4 67.9 6.5 2.0 2.38 Sch 67.9 72.9 6.5 2.0 2.38 Sch | 40 PVC 40 Screen 0.010 | 2.0 63.9 | Cement grout | 38. Pitless adapter installed |
| 0.00 0.00 0.00 | 40 Screen 0.010 | 65.9 65.9 | Bentonite pellets Silica sand | ☐ Yes ☐ No — 39. Pump installed: |
| | | 1 | · | Submersible Jet Bailer or bucket |
| 48. Lithologic log (if more space is needed, co | ntinue on separate page) | 49. Sketch map | <u> </u> | ☐ Turbine ☐ Hand ☐ No pump : 40. Depth to |
| From To Description Country (ft) depth (ft) (include any show of water and | otion of indicate apparent quality) | See attach | ment | intake (ft) |
| See attachment | |] | | 41. Apparent quality and odor 및 Clear 및 본 당 등 |
| | |] | | 2 |
| | - | | | |
| | - | - | | Turbid |
| | - | - | | COLIFORM TEST 42. Coliform test type |
| | - | | | fecal fecal and total |
| | | | | 43. Coliform test results ☐ 0 or <1.0 ☐ TNTC ☐ Confluent |
| | - | | | # coloring |
| | - | | | or # colollies per 100 mL |
| | | | | 44. Date |
| | - | | | sampled Month Day Year |
| | | | | 45. Date analyzed |
| | | | | |
| 50. Comments 4 1/4" ID HSA followed by 10 1/2" drag bit | advanced to 28.4'. Am | | to 28.4'. 6 1/2" tricons ti- | Latitude 37 649307 |
| advanced to 73.4'. Silica sand set 72.9'- pellets set 63.9'-65.9'. After minimum 8 | 73,4. 2" casing and scr | reen set. Sand pl | aced 65.9'-72.9'. Bentonite | 37.649307 Longitude |
| 8" casing pulled and grouting continued to | 2'. Protective surface | casing and pad in | stalled after grout cured. | -87.503061 |
| 51. Affirmation: The work described above was do Note: the driller is not responsible for natural pr | ne under my supervision, and | this report is true and | correct to the best of my knowledge. | Lat/Long Method |
| Signature of | omoware quality or quantil | Date | uning or completing this well. | ☐ INT ☐ GPS 🔀 SUR ☐ REP |
| certified driller Certification | Drilling | signed | 2123/16 | Date Received |
| number 0219-0364-00 | | Engineers, Inc. | | <u>'</u> |
| | | | - | rev 02/29/2012 |

48. Lithologic Log MW-7

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--------------------------------------|
| 0.0 | 6.5 | Silty clay brown |
| 6.5 | 11.7 | Silty clay brown, moist |
| 11.7 | 12.9 | Silty clay yellowish brown moist |
| 12.9 | 15.5 | Sandy clay yellowish brown moist |
| 15.5 | 18.8 | Sandy clay yellowish brown moist |
| 18.8 | 24.1 | Silty sand yellowish brown wet |
| 24.1 | 28.4 | Sandstone yellowish brown weathered |
| | 28.4 | Auger refusal |
| 28.4 | 33.8 | Sandstone yellowish brown weathered |
| 33.8 | 37.3 | Shale dark gray |
| 37.3 | 49.8 | Shale gray soft |
| 49.8 | 51.4 | Shale w/interbedded shale gray soft |
| 51.4 | 55.3 | Sandstone gray hard |
| 55.3 | 57.6 | Sandstone w/sandy shale streaks gray |
| 57.6 | 63.4 | Sandy shale gray |
| 63.4 | 66.7 | Shale gray |
| 66.7 | 67.0 | Sandy shale gray |
| 67.0 | 67.5 | Shale gray w/interbedded sandstone |
| 67.5 | 73.4 | Sandstone gray |
| | 73.4 | TD |

MONITORING WELL 8006-3934 (MW-7)



| BIG RIVERS ELECT | Job Number: | 15-0140F | Revisions: | |
|-----------------------|-------------|---|----------------|----------|
| BIO INVERSO ELECTI | Date: | 12/28/15 | | |
| Well Construc | Scale: | No Scale | | |
| | 3 | Drawn By: | D. Dunbar | |
| SOCIATED NGINEERS, | Dhone | th Main St. · M (270) 821-7732 ww.associatede | · Fax: (270) 8 | 321-7789 |

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
If must be typed or neatly printed or it will be returned to the driller as unaccer

Attach Well Identification Number (AKGWA) Label Here Water wells: yellow labels

| | | | or it will be returned one copy to owner, on | | | | Moi | nitoring wells: blue labels | |
|------------------------------------|--|-------------------------------------|---|--|---------------------------|--|--|--|--|
| 4. Owner | | ectric Corpora | | NOW PERSON OF THE PERSON OF TH | | NOTE THE PARTY OF | | 1. Kentucky Well ID (AKG | WA) Number |
| 5. Owner | Third Str | | | | | | | 8006 - 393 | 35 |
| 6. City | Tilliu Sti | eet | | 7. | | 8. | | 2. Owner well ID# MW-8 | |
| Her | nderson dress differ fro | om owner name and | address: | State | KY | Zip 42420 | | 3. Attachments | |
| 9. Site name Seb | ree Statior | n | | | | | | 1. Site plan or sketch ma | ap 🛚 |
| 10. Site address 9000 | 0 Highway | y 2096 | | | | | | Well location On topographic map | |
| 11. City | ards | | | 12. State | KY | 13. Zip 42452 | | Obtained by GPS ur Conditionally Required | nit 🗆 |
| 14. Agency | | | 15. Facility type | CERCLA | √□s | Solid Waste | Drinking Water | Well diagram (monito Coliform analysis (if a | pplicable) |
| | 196 | | & 🗆 | RCRA | □ u | | Mining | Signed Variance (if ap Optional | oplicable) 🛛 |
| Number | | · | ID Number CC | CR Rul | е | NAME AND ADDRESS OF THE PARTY O | and the same of th | 6. Other laboratory analy | ysis report |
| 16.Owner phone | 270 = | 844 = | 6031 17. Sin | | 70 = | 521 - | 7927 | start date | .0 15 |
| 18. USGS topo map R | Robards | | | | | | | Month Day 24. Install | 16 |
| 10 County | | | | | 21. Sur | | 205.04 | end date 07 06 Please report depths in feet b | en an and decire to the England Salar State of the |
| 20. Physiographi | Henderson c □ Blue | | Ohio River Alluvium | | | on (11) evation determin | 385 _o 84 | surface, not as relative elevat | |
| Region | ☐ E. C | CONTRACTOR CONTRACTOR CONTRACTOR | W. Coal Field Jackson Purchase | | ☐GPS 図Surv | S □Map □ F | | 25. Total depth | 54,2 |
| 29. Well use | IVII3 | | 30. Drilling method | | (74) | 31. Well statu | ıs | 26. Depth to bedrock | 44 2 |
| Agriculture | | ☐ Geotherma | | ∟ Jet was] Push/pr | | | Inactive for intended use | 27. Static water level | -6 81 |
| ☐ Commercial ☐ Domestic | | ☐ HVAC | ☐ Auger – bucket☐ ☐ Auger – hand☐ | Rotary - | – air | 32. Wellhead | ☐ Well cap | 28. Casing height | |
| Industrial | | ☐ Injection | ☐ Cable tool | Rotary - | reverse | | Sanitary seal | | 05 ₆ 24 |
| Monitoring / Remed | 01 | Mining | ☐ Driven Casing ☐ | Sonic | | Surging | lopment method Jetting | WATER WELLS 34. Estimated well yield | gpm |
| ☐ Public | | Unused | □ Excavation □ Combined - HS | Unknow auger an | | | ☐ Backwashing ☐ Compressed air | | ☐ gph ☐ gpd |
| | REQUIRED fo | or most well uses. | ☐ Combined – other | er (specif | y): | _ | of methods (specify) and water flush | 35. Well service | #of people |
| 46. Well completi | THE RESERVE THE PARTY OF THE PA | And Desired Williams and American | | 47. An | nulus fill a | | and water nusir | 36. Disinfectant amount | served 37. Type |
| From To | Borehole C | asing | asing type Scree | From | To depth | NOTE for W | laterial ATERWELLS only: | 30. Distinicciant amount | Bleach |
| depth (feet) (feet) 0.0 44.2 | | OD | slot siz | | (feet) | If cuttings (clay, are used, you mi | shale or limestone only) ust specify composition. | oz 🗋 qt 🗌 cups | ☐ Hypo- chlorite |
| 0.0 44.2 44.2 47.2 | | | 40 PVC | 2.0 | 43.2 | Cement gro | nut. | ☐ lb ☐ gal 38. Pitless adapter installed | _ |
| 47.2 52.2 | | | 40 Screen 0.01 | | 45.2 | Bentonite | | ☐ Yes ☐ No | |
| | | | | 45.2 | 54.2 | Silica sar | nd | 39. Pump installed: ☐ Submersible ☐ Jet | □ Bailer or bucket |
| 40 Lithologia log | (if more or | noon in product, on | ntinue on concrete nego) | 40 814 | etch map | | | ☐ Turbine ☐ Hand | ☐ No pump |
| From To depth (ft) | | | ntinue on separate page) ption ad indicate apparent quality) | | attach | ment | | intake (ft) | |
| depin (it) depin (it) | | achment | | | | | | 41. Apparent quality and o □ □ Clear 으로 | |
| | | | | | | | | APPEARANCE Appea | ☐ ☐ Iron |
| | | | | - | | | | Muddy 8 | ☐ ☐ Sulfur |
| | | | | | | | | COLIFORM TEST | ☐ ☐ Salt |
| | | | | | | | | 42. Coliform test type ☐ fecal ☐ fecal and tota | |
| | | | | - | | | | 43. Coliform test results | |
| | | | | | | | | □ 0 or <1.0 □ TNTC | ☐ Confluent |
| | | | | | | | | or | # colonies per 100 mL |
| | | | | | | | | 44. Date sampled | |
| | | | | | | | | Month Day | / Year |
| | | | | 1 | | | | 45. Date analyzed | |
| 50. Comments | | | | | | | | Latitude | |
| 4 1/4" ID HSA f advanced to 54. | 2'. Silica | sand set 52.2' | t advanced to 44.2'. 8 -54.2'. 2" casing and and 43.2' to 44.2 as casi | screen se | t. Sand | placed 45.2'-52. | .2'. Bentonite | 37.648863 Longitude | |
| able to pull 8" after grout cur | casing due | to soil squeeze tive casing inst | e. Remaining annulus gr talled after artesian c | outed with | h cement o | using tremie met d (See 6/22/16 v | chod. Pad installed variance request). | -87.508597 | |
| Note: the driller | | | one under my supervision, an roundwater quality or quar | | ntered whil | | | Lat/Long Method | JR 🗌 REP |
| Signature of certified driller | Time | ex the | m de | / | Date signed | 08/31/16 | | Date Received | |
| Certification number (| 0219-0364-0 | 00 | Drilling company Associated | l Enginee | ers, Inc. | | | | |
| | | | | | | | | r | ev 02/29/2012 |

48. Lithologic Log MW-8

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--|
| 0.0 | 0.3 | Topsoil |
| 0.3 | 3.0 | Silty clay brown |
| 3.0 | 7.0 | Silty clay gray moist |
| 7.0 | 10.0 | Silty clay brown very moist |
| 10.0 | 21.5 | Silty clay brown wet |
| 21.5 | 27.0 | Silty clay gray wet |
| 27.0 | 44.2 | Silty clay w/gravel gray wet |
| | 44.2 | Auger refusal |
| 44.2 | 48.4 | Sandstone gray hard |
| 48.4 | 49.5 | Sandstone w/carbonaceous strks gray hard |
| 49.5 | 51.0 | Sandstone gray hard |
| 51.0 | 51.8 | Sandstone w/ shale strks gray |
| 51.8 | 54.2 | Sandy shale and interbedded sandstone gray |
| | 54.2 | TD |

MONITORING WELL 8006-3935 (MW-8) LOCKING CAP PLUG DUE TO ARTESIAN CONDITIONS, 2" ID INNER CASING EXTENDED 8.77" ABOVE SURFACE. OUTER PROTECTIVE CASING INSTALLED IN ACCORDANCE WITH APPROVED VARIANCE DATED 6/22/16 CONSTRUCTION INCLUDES 4 BUMPER GUARDS INSTALLED IN ACCORDANCE WITH 401 KAR 6:350 SECTION 8 CONCRETE PAD MIN. 6" THICKNESS AND 3' DIAMETER 6" ID PVC CASING 0.0 0.0' (ELEV. 385.84')_ CONCRETE 2.0° 10 1/2" Hole Diam. 8" ID PVC CASING **NEAT CEMENT GROUT** 2"I.D. PVC RISER 43.2 BENTONITE PELLETS 45.2' 47.2' 0.010 SLOT SILICA SAND **PVC** FILTER PACK SCREEN 52.2' 54.2' PLUG 6 1/2"

| | BIG RIVERS ELECTRIC CORPORATION | Job Number: | 15-0140F | Revisions: |
|----|---------------------------------|--|----------------|------------|
| | | Date: | 12/28/15 | |
| | Well Construction Diagram | Scale: | No Scale | п |
| | 0 | Drawn By: | D. Dunbar | |
| 罗音 | Phone: | th Main St. · N (270) 821-7732 ww.associated | 2 · Fax: (270) | 321-7789 |

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.

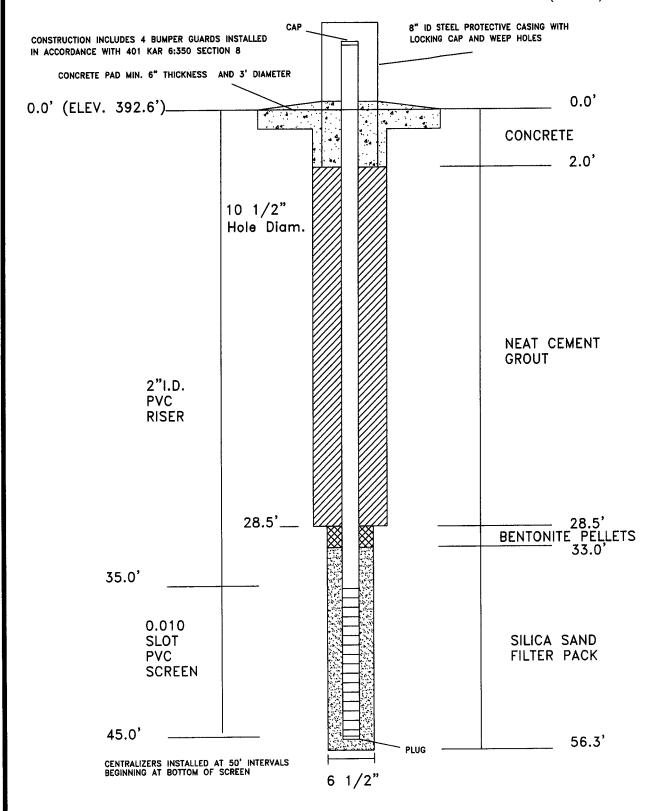


| One copy to Division of Water, | one copy to owner, c | ne copy to | driller's | s files. | | | |
|--|--|-------------------------|---|---|---|--|----------|
| 4. Owner Big Rivers Electric Corpor | ation | | | | | 1. Kentucky Well ID (AKGWA) Num | ber |
| 5. Owner address 201 Third Street | | | | | | 8006 • 3936 | |
| 6. City Henderson | | 7. State | KY | 8. Zip 42420 |) | well ID# MW-9 | |
| If site name and address differ from owner name an 9. Site name Sebree Station | d address: | | | 20120 | | 3. Attachments Required | |
| 10. Site | | | | | | Site plan or sketch map Well location | X |
| address 9000 Highway 2096 | | 12. | | 13. | | On topographic map, <u>OR</u> Obtained by GPS unit | |
| Robards 14. Agency | T 15 B 1911 | State | KY | Zip 42452 | | Conditionally Required 3. Well diagram (monitoring well) | <u>X</u> |
| Interest 4196 | 15. Facility type | JCERCLA]RCRA | , 15 | Solid Waste ☐ JST ☐ | Drinking Water Mining | Coliform analysis (if applicable) Signed Variance (if applicable) | |
| Number | ID Number | CCR Ru | le | | | Optional 6. Other laboratory analysis report | |
| 16. Owner phone 270 - 844 - | 6031 17. S | | 270 - | 521 - | 7927 | 23. Install start date 11 23 15 | <u> </u> |
| 18. USGS topo map Robards | | | · | | | Month Day Yea | |
| 19. County Henderson | | | 21. Sur | | 392.85 | end date 11 25 15 | |
| 20. Physiographic 🔲 Blue Grass 🔲 | Ohio River Alluvium | | elevatio | vation determine | | Please report depths in feet below ground surface, not as relative elevations. | j |
| | W. Coal Field Jackson Purchase | | □GPS ဩSun | S □Map □ P | | 25. Total depth 56 3 | |
| 29. Well use Agriculture Geotherm | 30. Drilling method al ☐ Auger – HS | | | 31. Well statu | | 26. Depth to bedrock 28, 2 | ı |
| ☐ Commercial ☐ Heat pum | D Auger – SS | ☐ Jet was ☐ Push/pr | obe | Unsuitable | for intended use | 27. Static | |
| ☐ Domestic ☐ HVAC | ☐ Auger – bucket ☐ Auger – hand | Rotary - | - mud | | Well cap | 28. Casing height | |
| ☐ Industrial ☐ Injection Monitoring / 0.1 ☐ Mining | ☐ Core | ☐ Rotary - ☐ Sand po | | | Sanitary seal | WATER WELLS ONLY | 괵 |
| Monitoring / | ☐ Driven Casing ☐ Excavation | Sonic Unknow | 'n | Surging | ☐ Jetting ☐ Backwashing | 34. Estimated well yield gpn | |
| NOTE: CODE REQUIRED for most well uses. | ☐ Combined - HS ☐ Combined - other | | | y 🔲 Bailing | Compressed air of methods (specify): | ☐ gph • ☐ gpd | |
| See back of form for codes. | _ Combined = on | - (specify | ·)· | | and water flush | #of peop | ole |
| 46. Well completion: Casing and screens | | | ulus fill s | ınd seal | | 36. Disinfectant amount 37. Type | ĺ |
| From To Borehole Casing depth depth diameter diam (in) (feet) (feet) (inches) ID OD | asing type Scre | | To depth (feet) | Ma NOTE for WA (f cuttings (clay, si | BLGTAI ITER WELLS only: Itals or finastons only) at specify composition. | ☐ Bleach | |
| | 40 PVC | 0.0 | 2.0 | Concrete | at specify composition. | oz □qt □cups chlorite □lb □gal | , |
| | 40 PVC | 2.0 | 28.5 | Cement gro | _ | 38. Pitless adapter installed ☐ Yes ☐ No | |
| 35.0 45.0 6.5 2.0 2.38 Sch | 40 Screen 0.0 | 10 28.5 33.0 | 33.0 56.3 | Bentonite Silica san | | 39. Pump installed: | or I |
| | | | | | 7 | ☐ Submersible ☐ Jet ☐ bucket☐ ☐ Turbine ☐ Hand ☐ No pur | |
| 48. Lithologic log (if more space is needed, co | | _ | tch map | | | 40. Depth to intake (ft) | |
| depth (ft) depth (ft) (Include any show of water at | o morcate apparent quainy) | See | attach | ment | | 41. Apparent quality and odor U Clear 알볼 ㅎ 드 | ı |
| | | | | | | | |
| | | | | | | Muddy 6 | |
| | | - | | | | COLIFORM TEST | lt |
| | • | 1 | | | | 42. Coliform test type | 1 |
| | | | | | | fecal fecal and total 43. Coliform test results | |
| | | 1 | | | | □ 0 or <1.0 □ TNTC □ Confluer | |
| | | | | | | or # colonies per 100 m | |
| | | | | | | 44. Date sampled | |
| | | | | | | Month Day Year | 1 |
| | | | | | | analyzed | |
| 50. Comments | | Ш | | | | Latitude | \dashv |
| 4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 56.3'. Silica sand set 45.0'- pellets set 28.5'-33.0'. 8" casing pulled | 56.3'. 2" casing and | screen set | . Sand p | laced 33.0'-45.0 |)'. Bentonite | 37.647299 Longitude | \bot |
| surface casing and pad installed after gro | after minimum 8 hour | | | 3.000cu z -03 | Frocective | -87.507169 | |
| | ut cured. | | | | | -87.307169 | _ i |
| 51. Affirmation: The work described above was do Note: the driller is not responsible for natural gr | ut cured. ne under my supervision, ar | nd this report i | is true and ered while | correct to the best o | of my knowledge ting this well. | Lat/Long Method | \dashv |
| Note: the driller is not responsible for natural grant Signature of certified driller | ne under my supervision, ar oundwater quality or quar | nd this report i | is true and ered while Date signed | correct to the best of drilling or complete | of my knowledge ting this well. | Lat/Long Method | , |
| Note: the driller is not responsible for natural grants of | ne under my supervision, ar oundwater quality or qual Drilling | nd this report i | ered while Date signed | correct to the best of drilling or complete | of my knowledge. ting this well. | Lat/Long Method ☐ INT ☐ GPS ☑ SUR ☐ REF | , |

48. Lithologic Log MW-9

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--|
| 0.0 | 1.5 | Clay dark brown trace grass and roots |
| 1.5 | 12.0 | Clay yellowish brown moist |
| 12.0 | 23.2 | Clay brown wet |
| 23.2 | 28.2 | Sandy clay gray wet |
| 28.2 | 28.5 | Sandstone yellowish brown soft weathered |
| | 28.5 | Auger refusal |
| 28.5 | 30.5 | Sandstone yellowish brown soft weathered |
| 30.5 | 33.2 | Sandstone gray soft |
| 33.2 | 34.8 | Sandstone gray |
| 34.8 | 36.6 | Sandstone yellowish brown soft weathered |
| 36.6 | 44.6 | Sandstone gray |
| 44.6 | 50.8 | Shale and interbedded sandstone gray abundant carbonaceous laminations |
| 50.8 | 53.6 | Shale gray |
| 53.6 | 56.3 | Shale and interbedded sandstone gray |
| | 56.3 | TD |

MONITORING WELL 8006-3936 (MW-9)



| | BIG RIVERS ELECTRIC CORPORATION | Job Number: | 15-0140F | Revisions: |
|--------------------|-------------------------------------|--|----------------|------------|
| | DIGITAL CLEED IN TO COLL CLEAN COLL | Date: | 12/28/15 | |
| / <i>41</i> ////// | Well Construction Diagram | Scale: | No Scale | |
| | 77011 0011011 0011011 211091 21111 | Drawn By: | D. Dunbar | |
| FSE | Phone: | th Main St. · N (270) 821-7732 ww.associated | 2 · Fax: (270) | 821-7789 |

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.

Original copy must be submitted to Division of Water within 60 days of completion.

See instructions on reverse of form.

Record must be typed or neatly printed or it will be returned to the driller as unaccer

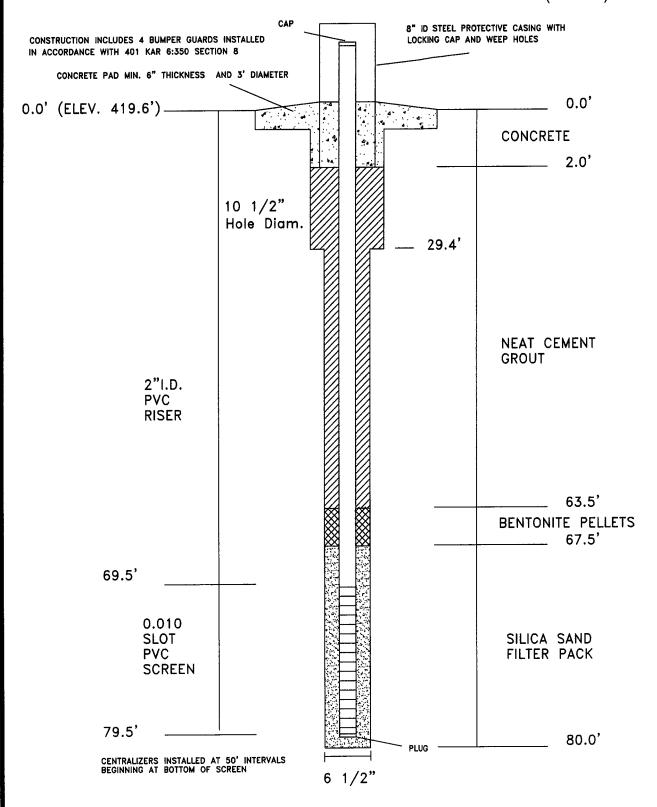


| One copy to Division of Water, | | | | |
|---|--|--------------------------------------|---|--|
| 4. Owner Big Rivers Electric Corpor | ation | | | 1. Kentucky Well ID (AKGWA) Number |
| 5. Owner address 201 Third Street | | | | 8006 • 3937 |
| 6. City | | 7. | 8. Zip ₄₂₄₂₀ | 2. Owner well ID# MW-10 |
| Henderson If site name and address differ from owner name an | d address: | State KY | Zip 42420 | 3. Attachments |
| 9. Site name Sebree Station | | | | Required 1. Site plan or sketch map |
| 10. Site address 9000 Highway 2096 | | | | 2. Well location On topographic map, OR |
| 11. City Robards | | 12. State KY | 13. Zip 42452 | Obtained by GPS unit Conditionally Required |
| 14. Agency | 15. Facility type | CERCLA □S | olid Waste Drinking Water | 3. Well diagram (monitoring well) 4. Coliform analysis (if applicable) |
| Interest 4196 (AI) | | RCRA 🔲 U | | 5. Signed Variance (if applicable) |
| Number | ID Number C | CR Rule | | 6. Other laboratory analysis report |
| 16. Owner phone 270 - 844 - | 6031 17. Sit | | 521 • 7927 | 23. Instali start date 12 1 15 |
| 18. USGS | | | | Month Day Year |
| 19. County | | 21. Suri | face | end date 1 5 15 |
| Webster | Ohio River Alluvium | elevatio | 123, 30 | Please report depths in feet below ground surface, not as relative elevations. |
| Region | W. Coal Field | □GPS | mannap and more report | 25. Total 80 0 |
| Miss. Plateau 29. Well use | Jackson Purchase 30. Drilling method | ∑ Surv | ey Prior well log 31. Well status | 26. Depth to |
| ☐ Agriculture ☐ Geotherm | Auger HS | Jet wash J Push/probe | X Active Inactive Unsuitable for intended use | bedrock 28 5 27. Static |
| ☐ Commercial ☐ Heat pum ☐ Domestic ☐ HVAC | ☐ Auger – bucket ☐ | Rotary – air | 32. Welthead | water level 29 28 |
| ☐ Domestic ☐ HVAC ☐ Injection | |] Rotary – mud] Rotary – reverse | ☐ Flush ☐ Well cap X Locking ☐ Sanitary seal | 28. Casing height above surface (in) 29.88 |
| Monitoring / O1 Mining Remed O1 | ☐ Core ☐ ☐ Driven Casing ☐ | Sand point Sonic | 33. Well development method Surging Jetting | WATER WELLS ONLY 34. Estimated well yield |
| ☐ Public ☐ Unused | | Unknown | Pumping Backwashing | □ gpiii |
| NOTE: CODE REQUIRED for most well uses. | Combined – othe | | y Bailing Compressed air Combination of methods (specify): | • gpd 35. Well service |
| See back of form for codes. | | | Air-lift pump and water flush | #of people served |
| 46. Well completion: Casing and screens From To Borehola Casing | | 47. Annulus fill a | | 36. Disinfectant amount 37. Type |
| depth depth diameter diam (in) (feet) (feet) (inches) ID OD | Casing type Screen slot size | depth depth | Material NOTE for WATER WELLS only: If cuttings (day, sinule or limestone only) are used, you must specify composition. | ☐ Bleach ☐ Hypo- |
| | 40 PVC | 0.0 2.0 | Concrete | oz qt cups chlorite |
| | 40 PVC | 2.0 63.5 | Cement grout | 38. Pitless adapter installed ☐ Yes ☐ No |
| 69.5 79.5 6.5 2.0 2.38 Sch | 40 Screen 0.01 | 63.5 67.5 67.5 80.0 | Bentonite pellets Silica sand | 39. Pump installed: |
| | | | | ☐ Submersible ☐ Jet ☐ bucket ☐ Turbine ☐ Hand ☐ No pump |
| 48. Lithologic log (if more space is needed, co | | 49. Sketch map | | 40. Depth to intake (ft) |
| From depth (ft) depth (ft) (include any show of water as | nd Indicate apparent quality) | See attachm | nent | 41. Apparent quality and odor |
| | | - | | Clear emou. |
| | · | | | A Cloudy O C |
| | | - | | Turbid |
| | - | | | COLIFORM TEST 42. Coliform test type |
| | | - | | ☐ fecal ☐ fecal and total |
| | - - |] | | 43. Coliform test results O or <1.0 TNTC Confluent |
| | | | | or # colonies |
| | | | | per 100 mL |
| | - | 1 | | 44. Date sampled |
| | - | | | Month Day Year 45. Date |
| | | | | analyzed |
| 50. Comments | advantad on on the | Y0 500 | | Latitude |
| 4 1/4" ID HSA followed by 10 1/2" drag bit advanced to 80.0'. Silica sand set 79.5'- pellets set 63.5'-67.5'. After minimum 8 | 80.0'. 2" casing and so | creen set. Sand pl | aced 67.5'-79.5'. Bentonire | 37.646374 |
| 8" casing pulled and grouting continued to | 2'. Protective surface | casing and pad ins | talled after grout cured. | Longitude -87.505864 |
| 51. Affirmation: The work described above was do Note: the driller is not responsible for natural gr | ne under my supervision, and roundwater quality or quanti | this report is true and o | correct to the best of my knowledge. | Lat/Long Method |
| Signature of certified driller | Q May | Date | 1 / 1 per / 11 | ☐ INT ☐ GPS [X] SUR ☐ REP Date Received |
| Certification number 0219-0364-00 | Drilling Associated | signed | 7/49/15 | |
| BUINDET 3217-0307-00 | company Associated | Engineers, Inc. | | rev 02/29/2012 |

48. Lithologic Log MW-10

| From depth (ft) | To depth (ft) | Description |
|--------------------|------------------|--------------------------------------|
| 0.0 | 0.3 | Dense graded aggregate |
| 0.3 | 12.9 | Silty clay yellowish brown |
| 12.9 | 14.0 | Silty clay brown moist |
| 14.0 | 17.5 | Sandy clay brown wet |
| 17.5 | 28.5 | Sandy clay yellowish brown wet |
| 28.5 | 29.4 | Shale gray soft |
| | 29.4 | Auger refusal |
| 30.0 | 35.8 | Shale gray soft |
| 35.8 | 37.6 | Sandstone gray |
| 37.6 | 48.5 | Shale and interbedded sandstone gray |
| 48.5 | 52.3 | Sandstone gray |
| 52.3 | 54.5 | Shale and interbedded sandstone gray |
| 54.5 | 55.6 | Shale gray |
| 55.6 | 59.7 | Shale gray soft |
| 59.7 | 60.9 | Shale and interbedded sandstone gray |
| 60.9 | 64.6 | Shale gray |
| 64.6 | 65.6 | Sandy shale gray |
| 65.6 | 66.5 | Sandstone gray |
| 66.5 | 68.4 | Shale and interbedded sandstone gray |
| 68.4 | 79.4 | Sandstone gray |
| 79.4 | 80.0 | Shale and interbedded sandstone gray |
| | 80.0 | TD |

MONITORING WELL 8006-3937 (MW-10)



| | BIG RIVERS ELECTRIC CORPORATION | Job Number: |
|--|---------------------------------|---|
| | Well Construction Diagram | Scale: No Scale |
| | | Drawn By: D. Dunbar |
| | Phone: | rth Main St. · Madisonville, K.Y. 42431 (270) 821-7732 · Fax: (270) 821-7789 ww.associatedengineers.com |